MAY, 1953

Products finishing

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Finishes on *Metal* Products

Cincinnati
PHOSPHATIZING MACHINE

"SIMPLE IN DESIGN ECONOMICAL IN OPERATION!"

reports shell division
C. A. Dunham Co.,
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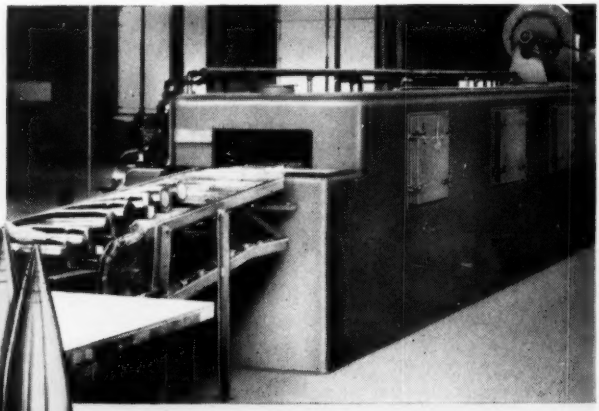

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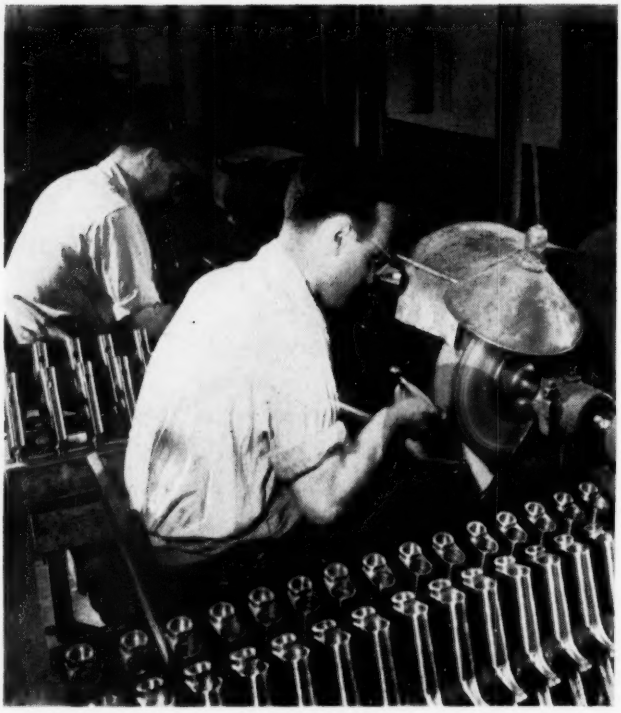

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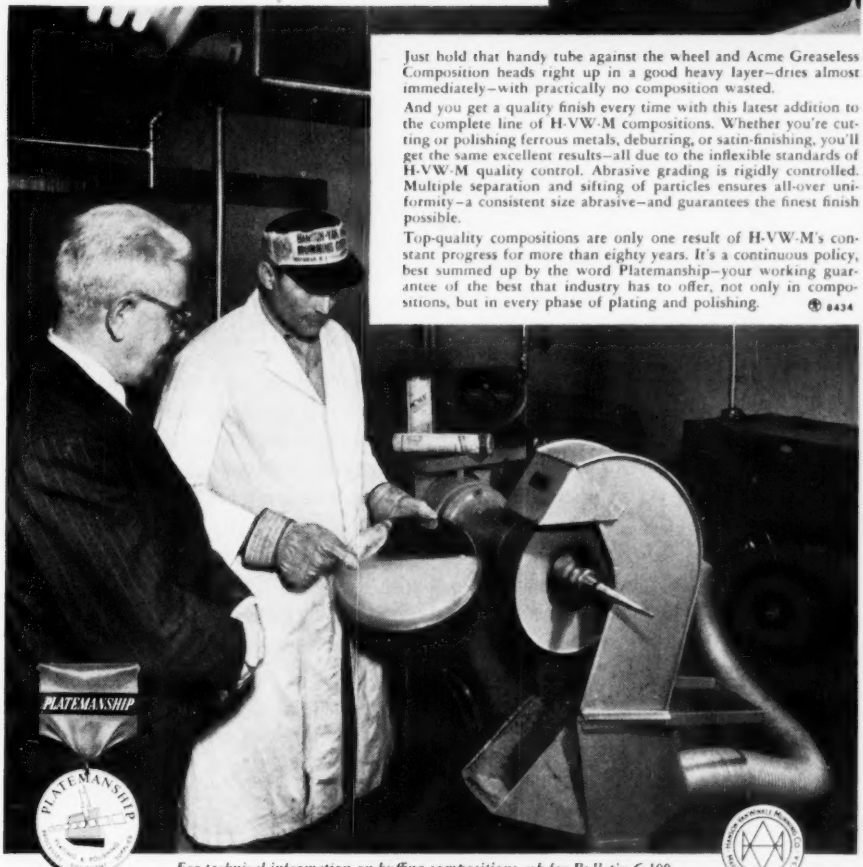

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MAY, 1953

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Products Finishing

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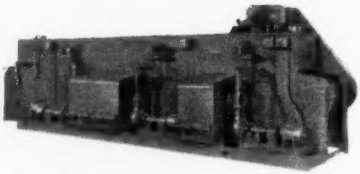

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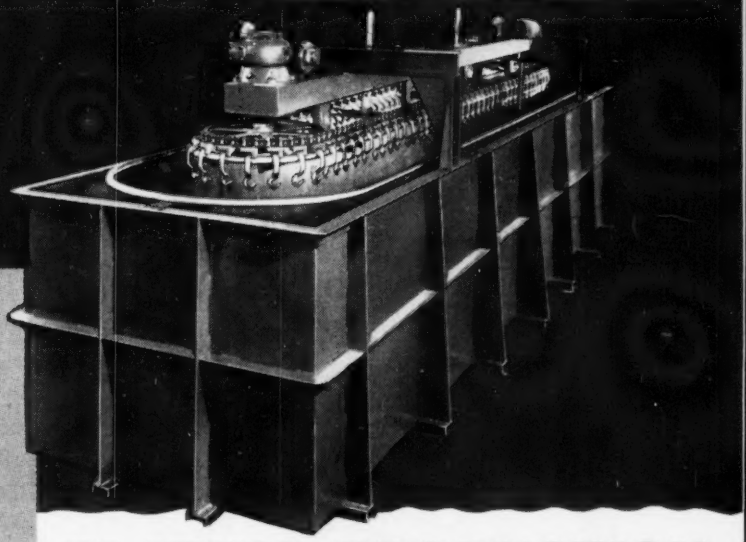

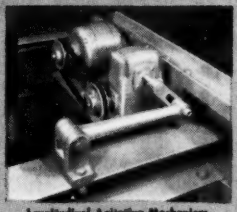

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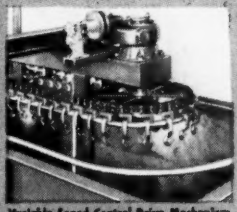
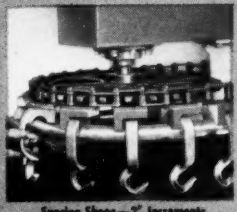


Variable Speed Control-Drive Mechanism



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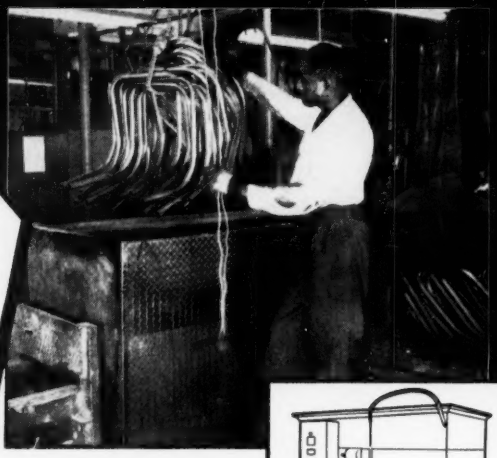

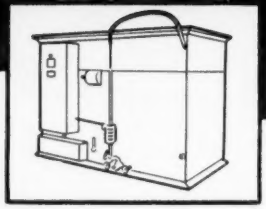

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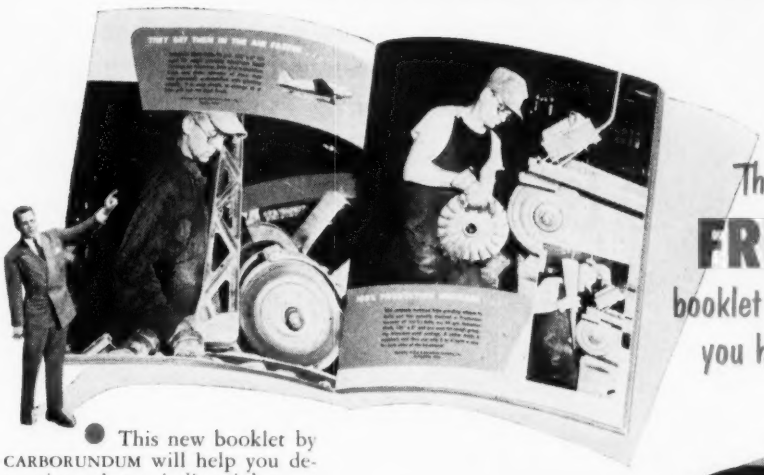

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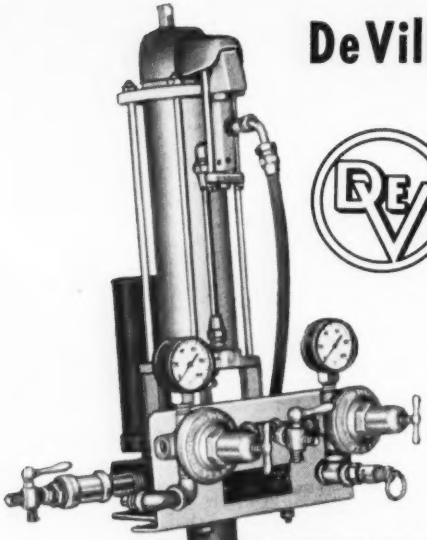

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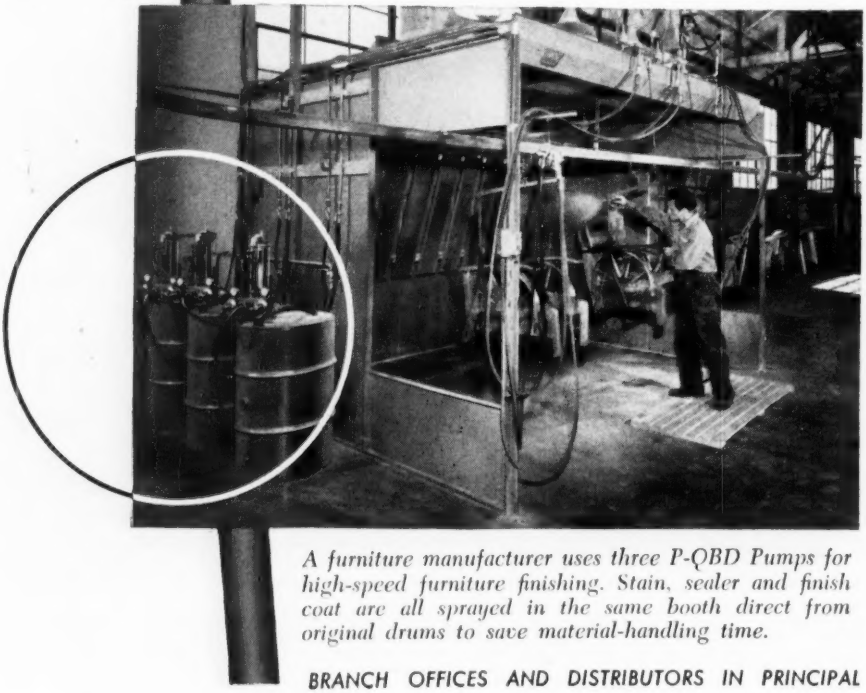

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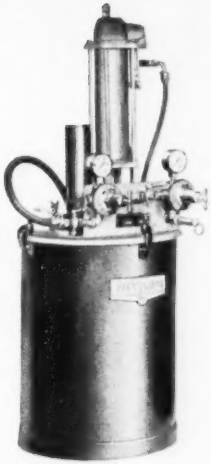

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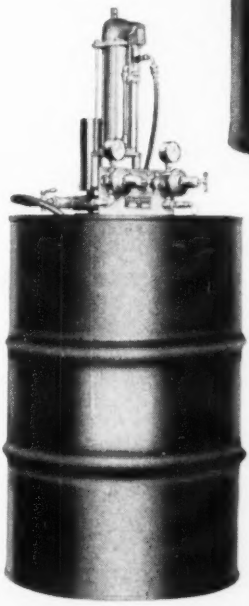

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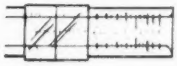

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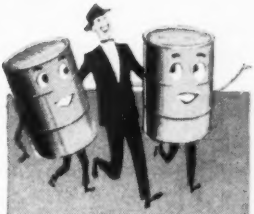

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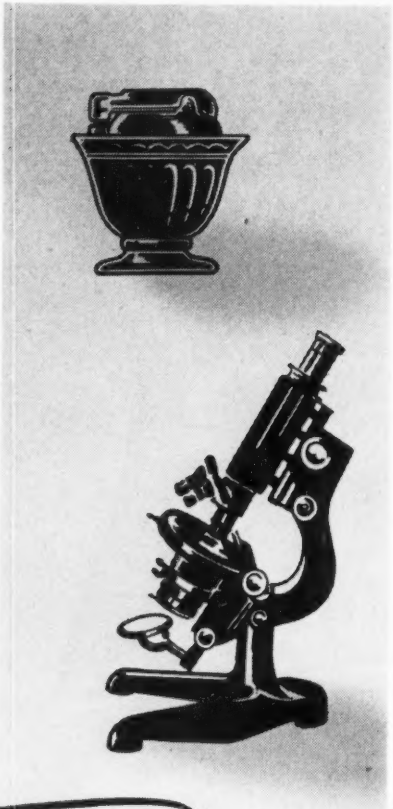

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PF editorial

MAY, 1953

Vol. 17, No. 8

A Need For Increased Understanding

Even with all the publicity that the electroplating industry has received, both in the trade and the popular press, there is evidence that a great need for further understanding of its practices and processes still exists.

Persons who buy electroplated ware or electroplating services must be kept better informed by their suppliers, by the press, and by the several technical and trade organizations, concerning the possibilities of the various electroplating processes. They must also be kept advised of the standing of the electroplaters with whom they are dealing.

The national and local organizations of job platers are able to advise prospective customers as to the ethical standards and abilities of their members. Plating shops involved in contracts or sub-contracts for the United States government or any of its branches must be certified as to their ability to produce quality products and to deliver the promised work on schedule. Also, some of the major industrial organizations certify their suppliers in much the same manner.

It might be a good investment in future business for all job platers to voluntarily certify themselves to their customers, presenting their customers with a statement regarding their plant, equipment, the processes in use, and the size of the establishment. Some trouble and expense would be involved in so doing, but it would provide the plater with a strong selling point when soliciting new business.

Why is all this necessary or desirable? To prevent purchasing agents or product designers from being taken in by fantastic claims made by unscrupulous persons for non-existent processes, or processes falsely described. It is difficult to understand that, in this day and age, persons in such positions should be so gullible, but reports from the job plating industry indicate that there are occurrances of this sort.

The plater, for his own protection and to prevent the electroplating industry or any part of that industry from getting a bad name, must make an even greater effort to sell, not only his services, but the fact that he and his legitimate fellow job platers have the technical skill and the facilities to produce high-quality plated ware according to the customer's specifications.

Ezra A. Blount

—EDITOR

Statistical Quality Control--Watchdog of Ford Finishes

The Ford Division of the Ford Motor Company uses Statistical Quality Control extensively throughout all its operations. In this article, the author relates the application of Statistical Quality Control to the finishing operations performed in the Dearborn Assembly Plant.

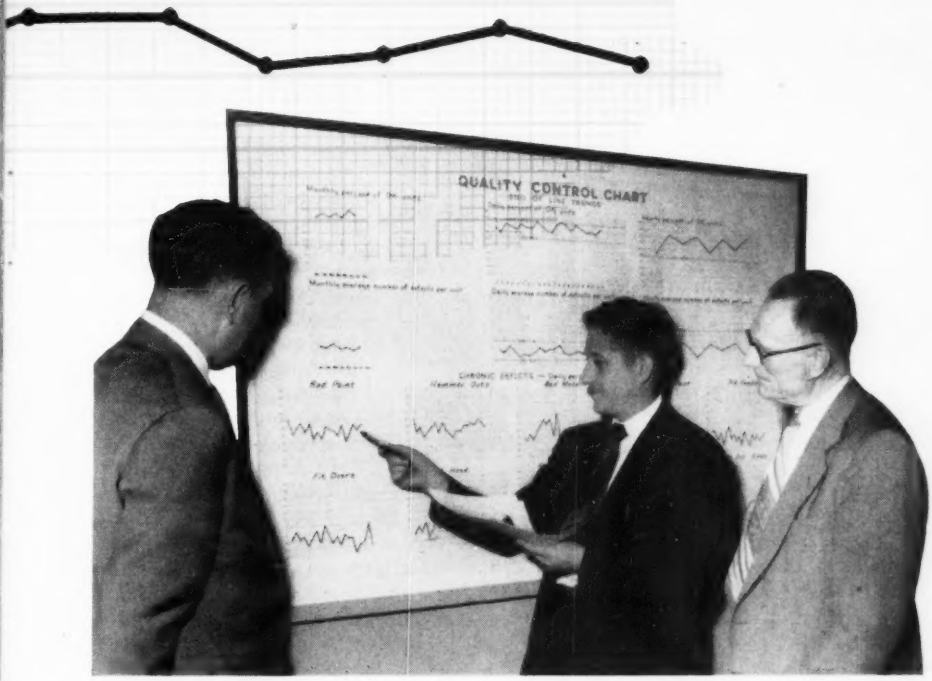
By FRANK L. BONEM

From the casting of cylinder blocks to the tightening of the last nut on the final assembly line, all operations in the production of a Ford are under Statistical Quality Control. At the Dearborn plant, where over 600 cars are produced daily,. an extensive system of chart control is used to aid in ensuring a high quality product.

Receiving Inspection

Receiving Inspection is the first of a series of steps necessary in producing a car that meets high quality standards. At Ford, materials coming from suppliers enter the receiving area and, after being recorded, are moved to the Receiving Inspection area. Random samples are picked in a quantity dictated by the total number of pieces in the received lot. Sampling tables, which show the number of defective parts that may occur in the sample for any given Acceptable Quality Level (A. Q. L.), as used by the plants of the Ford Motor Co., are derived from government tables J. A. N. Std.—105. The A. Q. L. used for each part is set by management. The inspector, knowing the lot size, the A. Q. L., the sample size, and the acceptance number, can reject or accept each shipment according to the number of sub-standard parts he finds in each sample.

In the inspection area, a file of Inspection Instruction Sheets is kept for each part that is purchased. These sheets show the part name, part number, characteristics that are to be inspected, the A. Q. L., the name of the gage used to inspect the part, as well as the gage number. The information collected during inspection is recorded on an Incoming Material Quality Record which lists the



F. O. Fason, manager of assembly, Quality Section; H. S. Bayer, former supervisor of statistical quality control; and R. A. Block, assembly quality control; all of Quality Control Department, Ford Division, Ford Motor Co., in front of an example of a typical "End of The Line" Trend Chart. Mr. Bayer is holding histograms, sent in from the various branches, and points to the chart which reflects the data.

sample size, defectives allowed, and defectives found. The data thus compiled are plotted on a Quality Trend or "P" Chart which is used to determine the overall quality of a certain part received from the vendor. Copies of these Trend Charts are sent to the purchasing department and then to the vendor.

Figure 1 shows the inspection of chromium plated bumper guards. The inspector checks the finish for blisters, dullness, dirt, scratches, and dings and burrs by comparison with standard models. Random samples are also sent to the laboratory where they are checked for material characteristics by standard tests, such as resistance to salt spray. For approval, parts must conform 100 per cent in these laboratory tests.

Paint is also inspected when received. Samples of paint, again picked at random from a lot, are reduced to spraying viscosity and sprayed on 4 by 12-inch test panels. These panels then undergo the process cycle of the body, hood, and fender after which they are checked for color, luster, fill and flow out. Only after approval following this test are paints permitted to be added to the paint circulating system. Random samples are also picked from each supplier on a monthly basis for laboratory analysis. This is a control check on the supplier. Also, each assembly plant prepares a series of test panels every month for outdoor exposure in six different testing locations maintained by Ford.

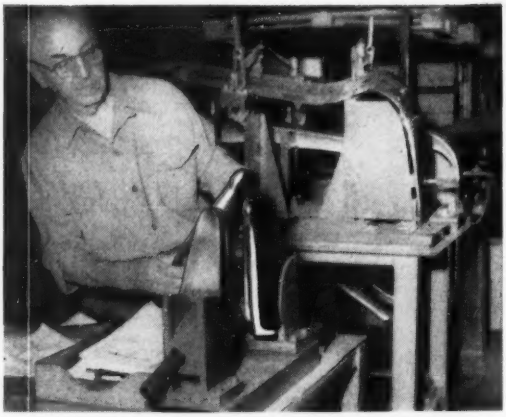


Fig. 1 — An inspector compares chromium plated bumper guards with standards at Receiving Inspection. Gages for the bumpers may be seen in the background.

●

S. Q. C. of Body Finishing

Finishing operations for hoods, fenders and bodies are to a great extent the same, and therefore only the finishing of bodies is taken up in detail here.

Formed parts for the Ford bodies are assembled in jigs and welded. Assembly operations are completed on a production line where all exterior joints are soldered and/or brazed. The bodies then go through the following finishing operations:

1. Smooth all rough parts of white metal (Fig. 2).
2. Preclean by washing with mineral spirits.
3. Phosphatize.
4. Dry in infra-red oven.
5. Glaze soldered joints to obtain smooth surface.
6. Apply combination primer - surfacer with spray guns at 100 p.s.i. air, and 25 p.s.i. fluid pressure in a down-draft exhaust spray booth.
7. Bake for 15 minutes in infra-red oven at a temperature of 380 deg. F. The oven and light arrange-

Fig. 2—View of a production line at the Ford Dearborn Assembly Plant where weld marks and rough spots are smoothed down with files, ding hammers, and grinders.

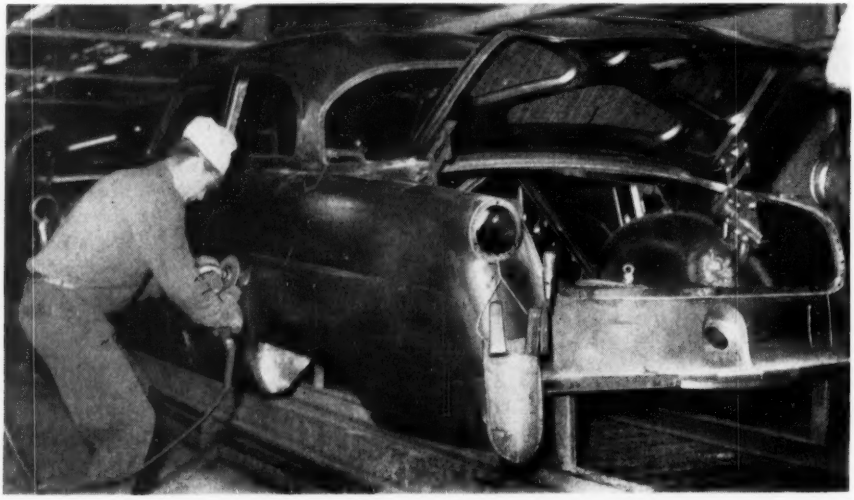
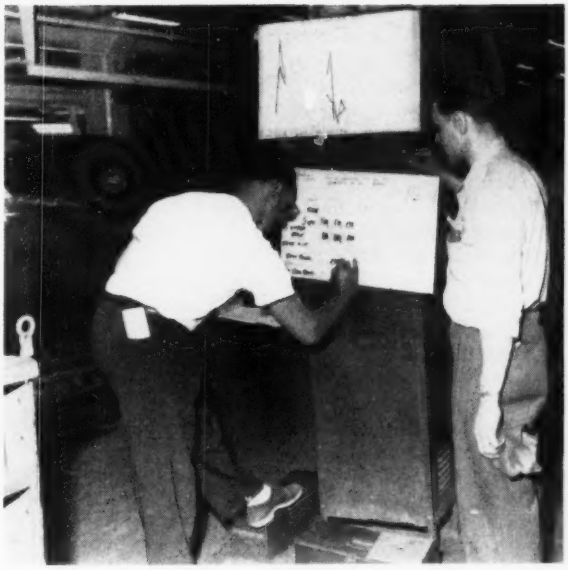


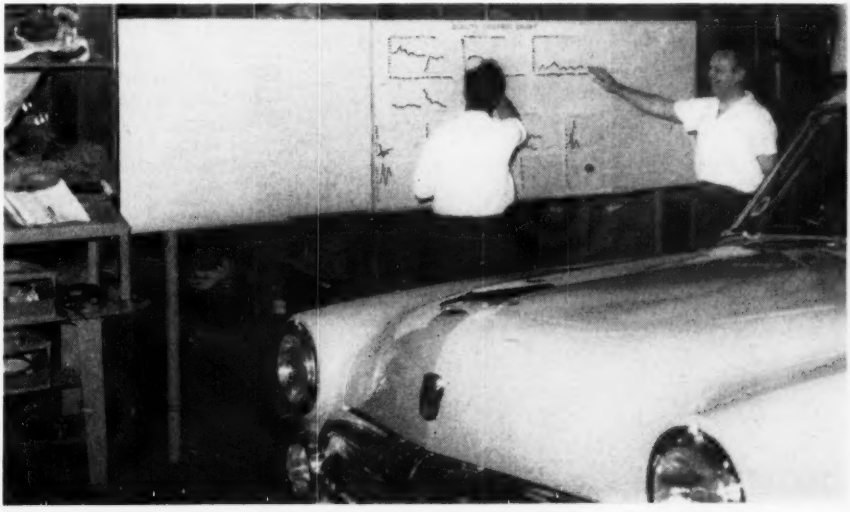
Fig. 3—From the data collected by the inspector (Fig. 5) charts are plotted on the white metal finishing operations which are located right along the production line which may be seen in the background and also in Fig. 2. Thus, the worker and his foreman know exactly the quality level of work that is being turned out.



ment was designed by Ford engineers.

8. Wet sand all body surfaces using 320 and 360 grit emery paper. The work of this operation is accomplished 50 per cent by hand and 50 per cent by air operated mechanical sanders.

Fig. 4—View of the end of the final assembly line at Ford's Dearborn Plant. The chart in the immediate background (right) is an "End of the Line" Trend Chart, an example of which may be better observed in the article heading. The top section shows hourly, daily and monthly defects per unit and per cent OK unit figures. The bottom section shows daily trends of the per cent defective of the ten most chronic items in that section of the line. The charts on the left are detailed hourly breakdowns of the results from some of the operators.



9. Dry in infra-red oven.
10. Wipe with tack rags.
11. Spray-paint with enamel, applying approximately three coats for a good film thickness. The spray guns employed for this operation are used at an air pressure of 85 p.s.i. and fluid pressure of 33 p.s.i.
12. Bake in steam heated oven held between 250 and 270 deg. F. This bake oven, also Ford designed, has 4 conveyor lanes, each holding 15 bodies. The oven is located immediately behind the spray booth. Total time for spraying and baking is 60 minutes.
13. Inspect.

The system of charting at Ford assembly plants has been tailored to get information from the inspector back to the man performing the work and the production foreman responsible, a considerable job when it is considered that production lines are hundreds of yards long. Two distinct types of charts are employed: action and management charts.

Action charts consist of the foreman's charts "$\bar{X}$" & "R" charts, "P" and "C"* charts (See Fig. 3). The foreman's chart, which is of the scoreboard type is placed on the foreman's desk, or in a centrally located area in order that all operating personnel, as well as the foreman concerned with the operation, can note any significant changes.

When a defect has been plotted on this scoreboard chart for some time and no significant improvement is shown, an individual chart such as "$\bar{X}$" & "R," "P," or "C" chart is placed at the site of the operation in full view of the operator.

Management charts (see article heading and Fig. 4) show inspection information and are "End of the Line" Trend Charts. They are placed at the end of the production line and reflect the state of quality on that line for general supervision. The top section shows hourly, daily and monthly defects per unit and per cent OK unit figures. The bottom section shows daily trends of the per cent defective for the ten most chronic defects in that production line.

* See page 28, March, 1953, issue of PRODUCTS FINISHING.

Fig. 5—An inspector checks for white metal finish immediately after the operations shown in Fig. 2. The inspector marks all defects with crayon for further work. At the same time he keeps a data sheet on all bad spots found.

White Metal Finishing

Car bodies receive their first finishing operation while riding on

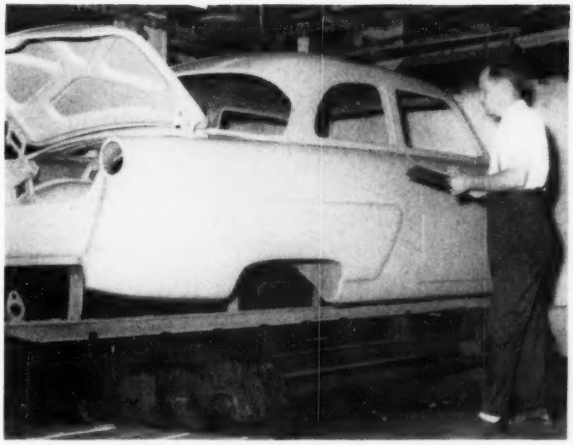


Fig. 6 — Coming from the bake oven, the finished bodies are inspected for all types of defects. Records of imperfections found at this inspecting station go to the various departments in which the faults for the defects lie.

a slat conveyor. Craftsmen on both sides of the conveyor remove weld marks and other surface imperfections with files, ding hammers, and pneumatic grinders faced with 36 grit Type C sand paper (See Fig. 2). At the end of this conveyor line, bodies are inspected as shown in Fig. 5.

The inspector wears a special glove on the hand with which he feels the surface. He marks the spots which need further work with crayon and records all imperfections found. His inspection sheet is divided into eight columns, one for each hour of the shift he works. The data recorded includes production, satisfactory units, per cent satisfactory, average number of defects per unit, and total defects. The defects which occur are marked under 22 different categories, thus calling attention immediately to any operation not producing acceptable quality.

The data thus obtained are recorded every hour on a "P" chart which is located at the point where defective car

Fig. 7—Paint defects found during inspection (Fig. 6) are marked on charts which are located outside the spray booths where sprayers take their "breaks." The top chart in this photograph is a "foreman's" or "scoreboard" type of chart. The charts are marked in red and black to differentiate between the two sides of the production line. The lower chart is a "C" Chart showing average hourly defects.

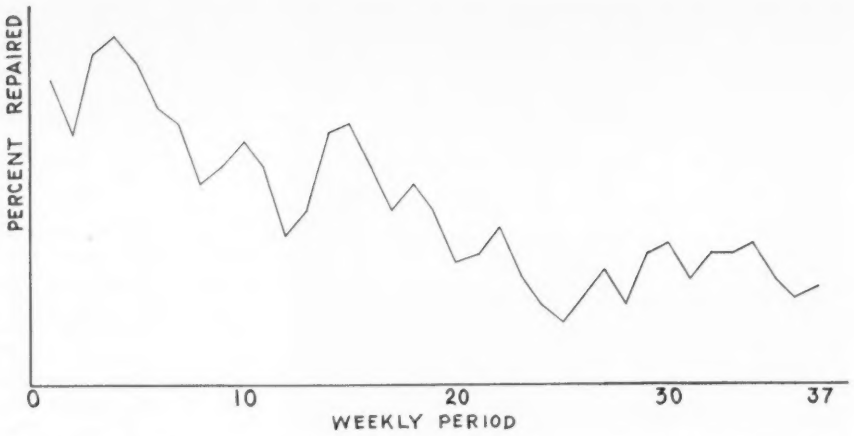


Fig. 8—This curve is an example of improvement due to the use of a "P" chart which reflects repairs made necessary on car bodies by reason of paint sags.
(Illustration courtesy Ford Division, Ford Motor Company)

bodies are shunted out of the conveyor for rework. Types of control charts which are located further back along the production line, where all workers can see them, are shown in Fig. 3.

The lower chart (Fig. 3) is the foreman's chart and shows the metal defects found at the end of the enamel bake oven. The chart is marked in two colors; one color for each side of the production line. Line headings at the left of the chart specify the area of the car body; the coded entries specify the exact nature of the defect. Thus, the cause for defects, which are not found till after the finish is applied, is brought back to the area where the cause lies, and pin-pointed to the exact man, or group of men responsible .

The upper chart (Fig. 3) is a "P" chart used for bringing a chronic defect—in this case the roof area—under better control. It shows the hourly per cent defective at the left and the daily per cent defective at the right. Again, actual inspection has occurred far from the work area, in this case at paint inspection, but the information is brought back to the area where something can be done about it.

Paint Finishing

The complete finish system in each body (or hood or fender) is thoroughly checked by two methods. As the bodies emerge from the final paint oven, they are checked by two inspectors, one on each side of the body (See Fig. 6). These men record the following defects under the hour during which they occur:

Dry spray.
Jitterbug marks.
Paint sags.
Dirt in paint.
Off-color paint.
Bulls eyes.
Undercoat mars.
Paint mars.
Water marks.
Bad metal.
Holes.
Pitted metal.
File marks.

Each hour the defects found under each category are entered on an "Inspector's Tally Sheet" which not only lists the same category of defects but also the area of defects, thereby pin-

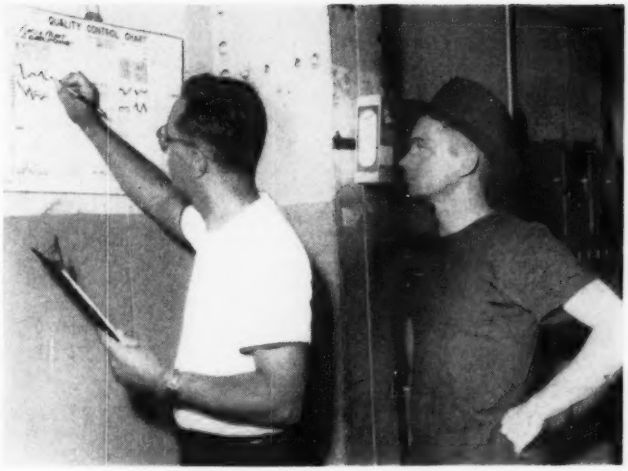


Fig. 10 — A view of one of the Group "$\bar{X}$" and "R" Charts which are used to control paint thickness. The chart is located outside the finish paint oven which immediately follows the finish paint spray booth.

pointing the trouble area to a great extent. Also on an hourly basis, the "number defective" found under each category is plotted on a foreman's chart or chronic defect chart located in the area of the operation where the defects occur. Thus bad metal, holes, file marks and so on are recorded on charts of the type shown in Fig. 3; dry spray, paint sags, off-color paint and paint mars are plotted on a chart located, as shown in Fig. 7 (top chart), outside the spray room where the men take their "breaks."

The lower chart in Fig. 7 is a "P" chart established to bring paint sags under closer control. As pointed out, this type of chart shows two curves—the hourly per cent defective (left) and the daily per cent defective (right) in order that all sprayers may see how much they have improved. One of the results of using quality control and keeping the charts in a place where

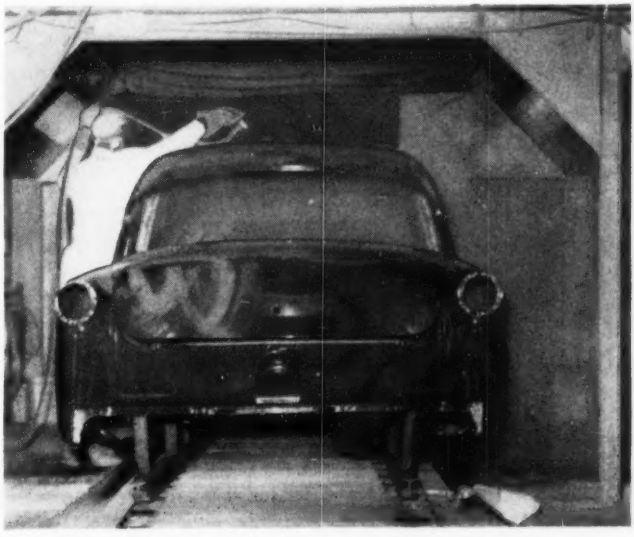


Fig. 9—A view of one of the paint spray booths in which bodies rejected for paint finish are repainted after sanding. No parts leave a Ford plant with a finish below the accepted quality level.

operators may see them, is illustrated in Fig. 8, which is a chart that shows how the percentage of parts requiring reprocessing due to paint sags has decreased.

A "P" and foreman's chart are used to show hourly and daily per cent defective due to dirt in paint. These charts are located in the clean-up area where dirty air filters, which if improperly cleaned will cause this type of defect, are checked.

Bodies with imperfect finishes are routed out of the assembly line. The defective areas are sanded with mechanical sanders, using 360-A sand paper. Bodies are then refinished in spray booths, such as the one shown in Fig. 9, and baked in an oven.

One recent application of a comparatively new development at Ford is the use of the Group "$\bar{X}$" and "R" chart.* These charts cover situations where a number of parallel operations occur; Ford applies them to paint thickness. The data for these charts are kept according to a code system, each specific parallel operation having a number. The "$\bar{X}$'s" and "R's" are then calculated for each individual numbered operation. In the plotting of the final chart, only maximum and minimum

* D. F. Boyd, Applying The Group "$\bar{X}$" & "R" Chart, Industrial Quality Control, 7, No. 3 (Nov. 1950).

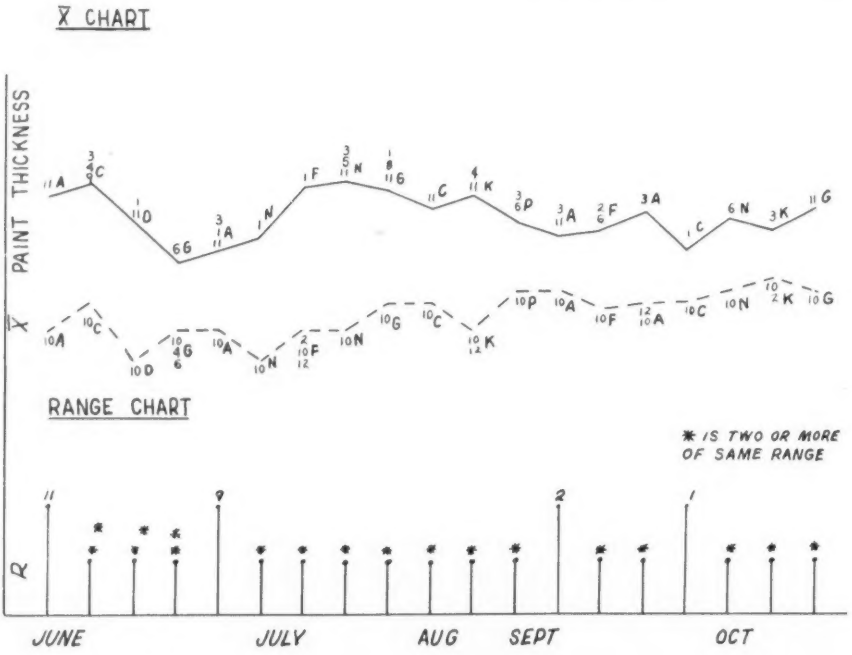


Fig. 11—A Group $\bar{X}$ & R Chart which reflects the steady improvement in the paint finish. The symbols which appear along the two $\bar{X}$ curves designate the color of paint used and the area in which the defect occurred. Each curve represents one side of the body or one side of the production line.
(Illustration courtesy Ford Division, Ford Motor Company)

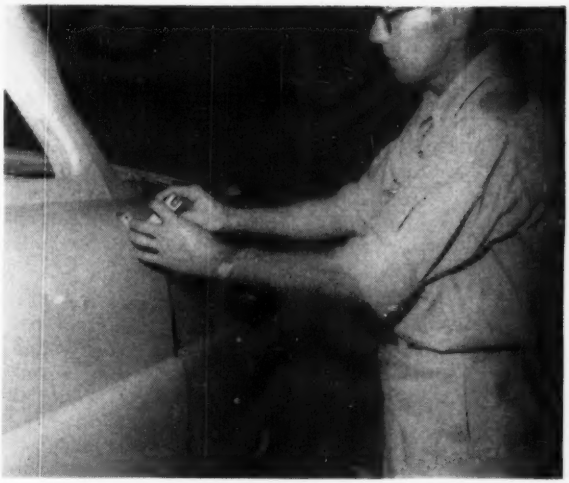


Fig. 12—A car body is checked with Ferro Elcometer for total paint thickness. The readings found by this inspector are recorded, and maximums and minimums plotted on the chart shown in Fig. 10.
(All photos by PRODUCTS FINISHING)

●

"$\bar{X}$'s" and "R's" are plotted (see Figs. 10 and 11) in each case instead of all "$\bar{X}$'s" and "R's."

The data for these charts are collected by a roaming inspector who follows a body, hood or fender through the complete finishing process. Using a Ferro Elcometer, this inspector measures the film thickness and final thickness (see Fig. 12) at three stations: immediately after the prime oven, after the wet sanding of the prime, and after final painting. Information of inspection is made available to the prime sprayers, the wet sanders, and enamel booth sprayers respectively by the plotting of charts which are located respectively at a point available to prime spray booth operators; in the wet sanding area; and in an area accessible to final enamel spray booth operators.

Separate charts are kept for the right side and left side of the product being painted and the large pieces, such as the bodies, are separated into a number of specific areas which are given a code number. One such breakdown is as follows:

1. Cowl area.
2. Front roof.
3. Middle roof.
4. Back roof.
5. Upper back panel.
6. Roof panel below back light.
7. Upper deck.
8. Lower deck.
9. Quarter panel.
10. Quarter rocker panel.
11. Door panel.
12. Door rocker panel.

Thus the work of individual operators, groups of operators, and/or body areas with special production problems can be pin-pointed. To point out difficulties with different paints, the charts for the final paint also include a code letter for the colors.

The inspector takes two thickness readings on each part of the body (or fender or hood) and records these readings on a data sheet which already is divided to show the area where the readings were taken. Lines on this sheet provide spaces not only for the two readings but also for the calculation of "$\bar{X}$" and "R".

From the inspection after sanding operations "C" charts (Defect Per Unit Chart) are established. These charts reflect the number of bare spots in the prime coat or the areas that require additional primer.

Each of the 15 assembly plants sends in bi-monthly reports to the Ford Division Staff, which are in the form of

histograms*, examples of which are shown in Fig. 13 and 14. These reports reflect the distribution of film thickness readings taken immediately after prime spraying, after wet sanding of prime, and after final painting. Data for these histograms is the same as that used for plotting the control charts. In Fig. 13 the thin coats, in this case the primer, show up in the first two periods (the first two columns, reading from left to right). Figure 14 is drawn to the same scale and shows that the thin coats have been eliminated, as indicated by the complete absence of the first two columns. The improvement was due to follow-up action based on the Group $\overline{X}$ and R Chart.

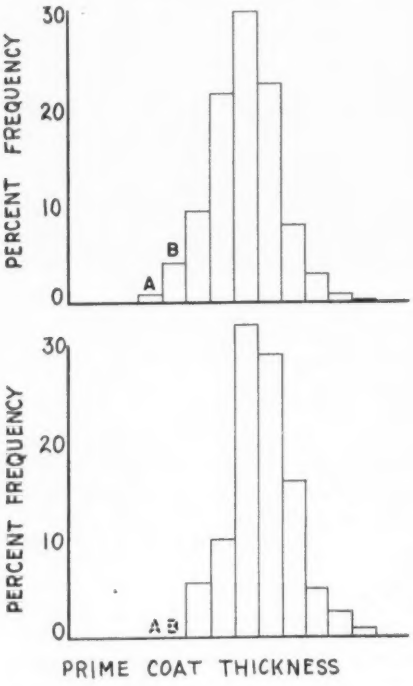


Fig. 13—(above) Histogram of prime coat film thickness before Group $\overline{X}$ & R Chart was used. On this graph the objectionable thin films appear as the first two columns on the left side, and are designated A and B.

Fig. 14—(lower chart) Histogram of prime coat thickness after corrective action, based on Group $\overline{X}$ and R Chart, was taken. Improvement in quality is shown by the fact that the thin films, formerly obtained, are no longer being experienced, as shown by the fact that the first two columns on the left side of the graph (A and B) are now missing.
(Illustrations courtesy Ford Division, Ford Motor Company)

A second type of chart that is used to reflect improvement in paint finishing, copies of which are also submitted to the Division Staff, is a "C" chart showing the average number of bare spots in prime per body as found before repair operations. A random sample of 50 cars, obtained during the reporting period, is taken.

The charts submitted from the various plants are analyzed and action taken where necessary. Special investigations are initiated on chronic or special items as the need arises.

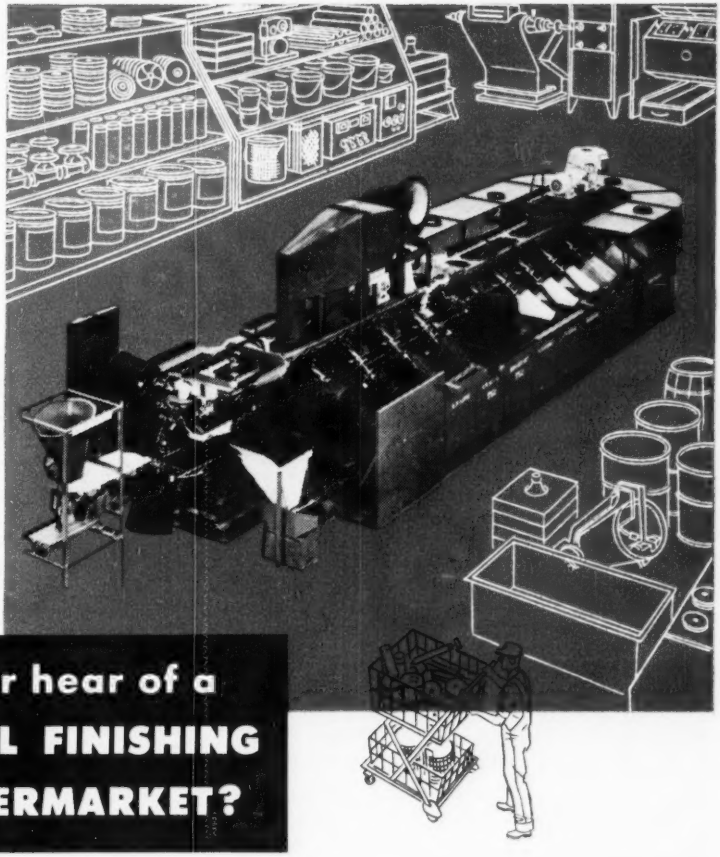
Reports on the various charts showing all data are made out daily. In order to be fully effective, copies of these reports are sent to engineering, plant manager, quality control manager, all production supervisors and foremen, and anyone in a position to help correct defects.

At Ford, the tool of Statistical Quality Control is also used to make management decisions. Consumer reports are periodically sent to the Quality Analysis Section. These reports give the average number of necessary adjustments or defects on a random sample. The data are plotted on control limits established. Trends are thus immediately spotted which aid considerably in making decisions as to maintenance of quality level in a specific plant or for overall production.

ACKNOWLEDGMENT

The author acknowledges with sincere thanks the cooperation of Harmon S. Bay-

* See page 28, March, 1953, issue of PRODUCTS FINISHING.



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er, who developed the Statistical Quality Control Technique while with the Ford Division, Ford Motor Company and has now formed a quality control consultant service, and W. F. Flanagan, field coordinator, Quality Control Department, Ford Division, Ford Motor Company, in providing information contained in this article.

The author also wishes to express thanks for the use of the following literature, from which he drew freely:

1. Harmon S. Bayer and F. J. Newton, Recent Experiences in the Application of Statistical Quality Control Techniques to Automotive Assembly Problems, presented at the 6th Annual Forum of the Michigan Section, American Society for Quality Control.

2. Chart Control in Machining and Processing, Ford Motor Company.

3. Chart Control in Assembly Operations, Ford Motor Company.

4. Quality Control in Receiving Inspection, Ford Motor Company.

5. Quality Level Certification, Ford Motor Company.

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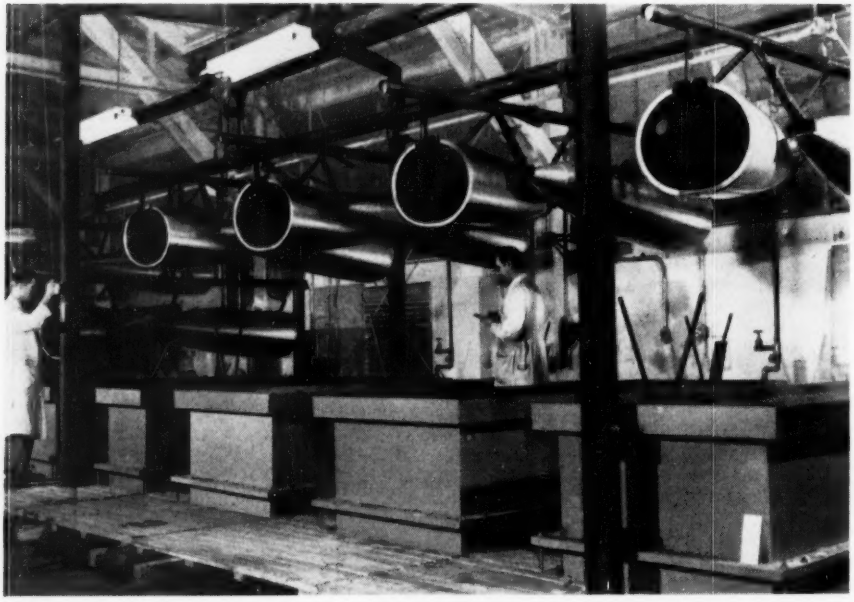

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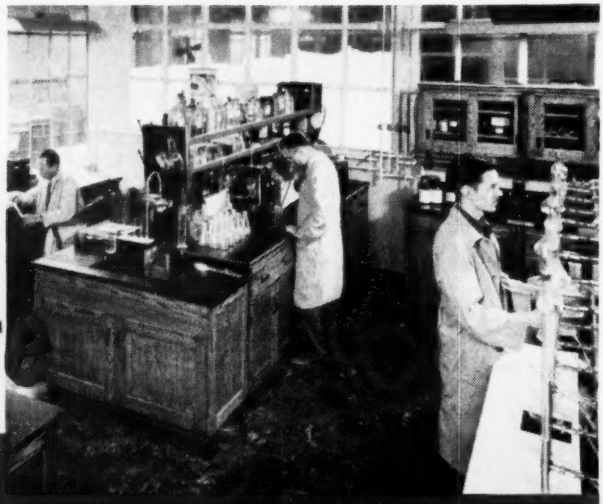

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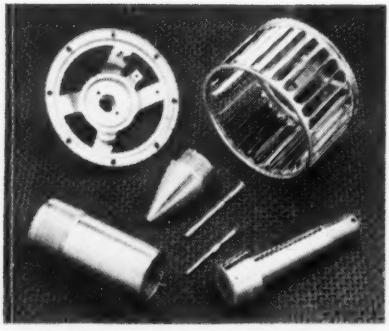

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Hub Caps Plated and Enameled in Conveyorized Setup

IN 1940 Los Angeles' Calnevar Company (then the American Specialties Manufacturing Company) consisted only of Fred Plotkin and a good idea; namely, chromium plated hub caps that fully covered the new stamped plate wheels then only recently placed on the market.

Today, Calnevar is the largest manufacturer of automotive wheel accessory replacements in the nation. By the end of 1952 it had produced a record of 10,000,000 hub caps in the short space

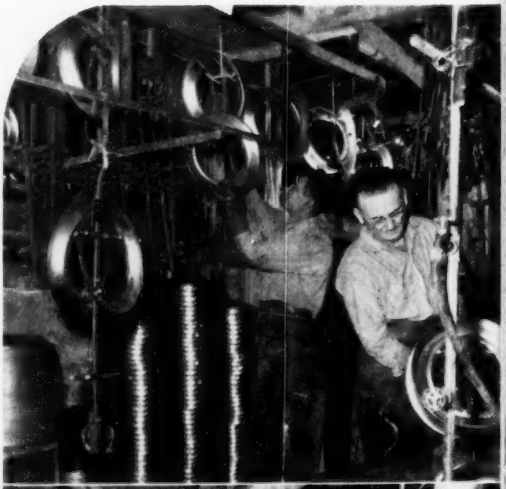

Fig. 1—(above, left) Virginia Martin demonstrates the Calnevar Company's new, snap-on hub cap made to simulate the $700 per set foreign wire wheels that will be a feature of Detroit's European-style sports cars.

Fig. 2—(above, right) Calnevar's unique conveyor system begins with the parts—here the company's chromsides which fit between the outer edge of the wheel and the inner hub cap featured by many current models—being removed from the rinse tanks after being copper plated. The water immediately begins to drain from the parts as the conveyor moves.

Fig. 3 — (below, right) The copper plated chomesides end their conveyor journey by traveling through a long pipe-like drying oven. They emerge spot free and are ready for buffing.

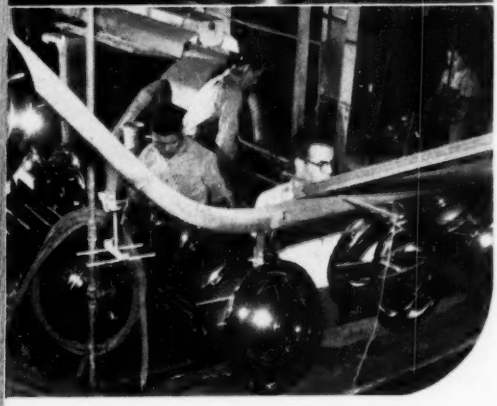

Fig. 4—(left) After copper plating, buffing is performed on a fully automatic machine. Buffs are furnished by the American Buff Company, and run about 2,700 r.p.m.

Fig. 5—(left, below) Chromium plated parts are removed from the plating tank, rinsed, and hung on the final finish conveyor, traveling at a speed of ten feet per minute. As the parts move, the rinse water drips off into the drip trough beneath.

of a decade and a half, with time out for war.

When Plotkin's "ripple wheel disks" appeared on the market in those pre-war years, glitter conscious Americans boomed them into a national fad. Today, 13 years later, Calnevar has embarked on another enterprise—wire wheel hub caps (see Fig. 1) which gives every indication of enjoying the same popularity as the ripple wheel disks.

The Plotkins have plowed their profits back into machinery and production equipment. They concentrate on a smoothly running, dovetailed production line that always has been the subject of constant experimentation. As a result they have constantly lowered unit production costs by increasing efficiency.

Because the product is so dependent on quality of finish, the Calnevar Company has concentrated on quality and speed in the finishing operation. Calnevar hub caps now are processed step by step from delivery of metal sheet, through buffing operations and plating techniques without a single halt for

Fig. 6 — (right) After traveling 160 feet, the chromium plated parts are given a warm air bath in which fans blow the final droplets off the parts which are now perfectly ready for the enameling process. The conveyor system has eliminated the need for color buffing, as the parts dry completely spot-free and without sedimentation of any kind. Elimination of color buffing leave a microscopically rough finish on the part that aids adherence of the paint film.

storage. Principal innovations in the Calnevar Company's plating processes have been the decrease of plating time by increasing plating current density, the elimination of several buffing operations with a paradoxical increase in appearance and quality; and the improvement of enameling processes with a substantial decrease in time of operation.

The Plating Process

A rough stamped or spun hub cap is brought to the polishing room where it is polished in 25 seconds with a Behr-Manning No. 180 grit polishing belt on a L'Hommedieu polishing lathe and machine. Feature of this process is the use of Alert Supply Company liquid grease and a Carborundum backup wheel set up on a Divine Brothers backstand idler. This ensures far greater accuracy of polishing and increases belt life.

After each hub cap is polished, it is conveyed to the Du Pont high speed copper plating bath and plated. Copper plating production is at the rate of 400 units per hour. Hub caps are plated 10 minutes at 50 amp./sq. ft.

Units are placed on a unique conveyor system on which the parts drip dry completely free from sediment (see Figs. 2 and 3). They are delivered to the buffing room where they are buffed on a fully automatic machine designed and built by the Square Deal Company of California (see Fig. 4). The machine incorporates six buffing heads and eight stations which rotate in a complete cycle every 30 seconds. In operation it indexes to each position and the head lowers to buff the part. Automatically fed buffing material (supplied by L. H. Butcher Company) is cycled down 12 times per minute. Each buffing head rests on each part about five seconds, giving a production rate of about 500 an hour. Hourly production can be varied from 300 to 1000 pieces per hour. Buffs, furnished by the American Buff Company, are operated at about 2700 r.p.m.

Copper plated and buffed hub caps receive a nickel flash and a bright chromium plate. The chromium plated hubs are removed from the plating tank and given two 10 second cold water rinses (see Fig. 5). These rinsing processes at one time gave the Calnevar Company its greatest trouble.

Fig. 7 — Feature of Calnevar parts is the baked clean enamel finish. Here completed parts are placed on a conveyor by the man on the right. They are shown entering the spray booth. The conveyor moves at a speed of about 20 feet per minute. Parts are placed on four foot centers. Parts emerge from the cooling tunnel shown directly behind the woman worker at the left of the picture, and are removed and inspected for flaws by her. Thence they are sent to the packing room.

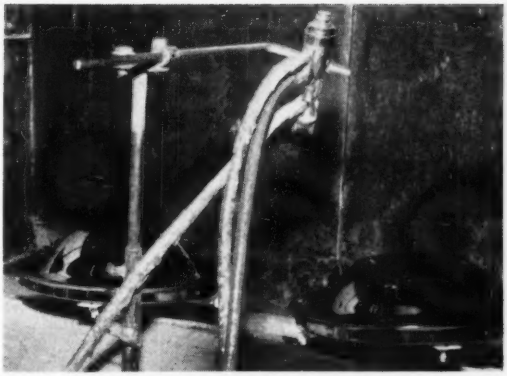

Fig. 8—Calnevar's full wheel covers are shown entering the automatic spray booth with the automatic spray head shown in the top center. The hub caps move continuously down the tunnel and into the baking oven. In the background is a waterfall paint trap.

Water is supplied to Los Angeles from several different sources at odd times. One day the water may be piped in from the Owens River Valley, the next day it may come from Hoover Dam, the third day it may be taken from artesian wells, and any day it may be a mixture of two or all of these waters. The effect of the different waters and their varying chemical compositions (both in plating baths and rinsing baths) was to create an unusual problem and a headache for company chemists trying to maintain constant processing conditions.

However, it was not until nickel allocations were cut that the situation became entirely untenable. Less nickel made the use of a final coat of baked clear enamel mandatory to overcome the consequent greater tendency of the part to corrode. Before the parts could be enameled, however, it was found that the plated hubs had to be put through at least four or five cleaning cycles and special buffing operations.

To eliminate this problem, Calnevar engineers designed a conveyor system to dry parts spot free. When the units are removed from the second chromium plate rinse, they are hooked to the 160 foot conveyor which travels at a speed of 10 feet per minute. As the part moves, the rinse water runs off into a drip trough underneath. At the end of the conveyor warm air fans blow the final droplets off the parts which are then ready for the enameling process (see Fig. 6). The elimination of color buffing leaves a microscopically rough finish on the part that aids adherence of the enamel.

Enamel Coating Operations

The new enameling process created additional problems of its own. These were: baking the enamel in an amount of time consistent with the speed of the entire production line; protecting the part with the enamel so that hubs would remain corrosion free.

Again, a conveyor system helped solve the problem. Parts are placed on this conveyor (moving at a speed of 20 feet per minute) on four foot centers. They enter an enclosed automatic spray machine where each part is machine rotated while the stationary head sprays Maas & Waldstein clear baking enamel for a period of six seconds (see Figs. 7 and 8). The enamel has a much higher flash point than the usual clear enamel—because of the short baking time of 4½ minutes.

The coated part enters an infra-red baking oven where the conveyor progresses for 30 feet at 250 deg. F., then 30 feet at 500 deg. F., then a distance of 30 feet where the temperature is lowered to 375 deg. F. (see Fig. 9). Thence the conveyor travels through a cooling tunnel where the temperature is gradually reduced to normal.

Low initial temperature is used to ensure that the enamel does not burn or blush. The final cooling process

Fig. 9—The sprayed parts enter the infra-red baking oven from a tunnel at the far left not shown, and into the baking zone where they move 30 feet in a temperature of 250 deg. F., for 30 feet at 500 deg. F., then a distance of 30 feet at a temperature of 375 deg. F. Thence the conveyor travels through a cooling tunnel where the temperature is gradually reduced to normal.
(Photos courtesy Calnevar Company, Los Angeles, California.)

helps to cure the enamel.

Calnevar Company's product passes a 200 hour salt spray corrosion test before breakdown. This test is about 100 per cent more severe than that generally considered adequate.

At the present time the smoothly working production line is capable of processing 6,000 units per day. Yet Calnevar officials still are constantly experimenting with ways to improve the quality of their product and to shorten the production time.

The Plotkins feel that quality is of utmost importance, for the fewer returns and the more satisfied customers, the more profitable will be the enterprise.

Tin-Nickel Alloy Plate

FIRST announced by the Tin Research Institute of England, a tin-nickel alloy plating process is currently under further commercial development in the research laboratories of the Metal and Thermit Corp., 100 E. 42nd St., New York 17, N. Y. The process consists of depositing an alloy of tin and nickel, in controlled proportions, to yield a plate which is both tarnish-resistant and decorative.

The Plate

The tin-nickel alloy deposit consists of 65 per cent tin, 35 per cent nickel, plus or minus 2 to 3 per cent either way. This composition represents the atomic percentage SnNi (theoretically 66.91 per cent Sn), and the deposit remains remarkably constant in composition over a wide range of operating conditions and solution variables.

The alloy is bright when plated on a polished or bright basis metal. It is usually sufficiently bright to be used as is; and, if not, a very light color buffing suffices. It is highly corrosion- and tarnish-resistant.

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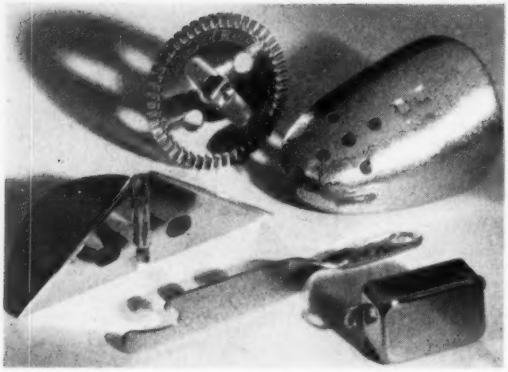

Some examples of tin-nickel alloy plated products.

steel, so that it should be plated in sufficiently heavy thicknesses to be substantially free from porosity.

In color the tin-nickel alloy possesses a faint pinkish cast which gives it a very pleasant appearance. The hardness of the plate is intermediate between that of nickel and chromium.

The alloy is moderately ductile, but not sufficiently so to permit much fabrication after plating. It is free of internal stress, however, and is not at all subject to spontaneous cracking or flaking. Nor is there any difference in building up thick deposits which are crack-free.

The tin-nickel plate is almost completely unaffected either by ordinary atmospheric exposure or by most common reagents. Failures which do occur are generally due to porosity rather than to corrosion of the deposit itself. The plate is easily solderable.

The tin-nickel alloy plate can be considered for almost any application that is normally finished in nickel plus chromium. Its solderability suggests uses in the electronics field where a decorative finish must also be soldered.

The plating solution has excellent throwing power. The cathode efficiency is 100 per cent and current densities and voltages are of the same order as for nickel plating.

The solution has excellent "activating" action on the basis metal and on the tin-nickel plate itself. Current interruptions are of no significance, and rejects can usually be merely put through again and replated without stripping.

The solution contains no addition agents; regulation is relatively simple, depending principally on Hull Cell tests and chemical analyses.

The tin-nickel alloy can be plated directly on copper, brass, and steel; but for best results a copper undercoat should be applied over steel. The bath has little or no leveling or brightening action, and the final finish will reflect the condition of the basis metal.

The following solution is used for plating:

*Stannochlor ($SnCl_2$) --- 5.8 oz./gal.
Nickel chloride ($NiCl_2 \cdot 6H_2O$) 40.0 oz./gal.
Sodium fluoride (NaF) 3.75 oz./gal.
Ammonium bifluoride (NH_4HF_2) 4.67 oz./gal.

Equipment

Tank: Lucite or neoprene—or rubber-lined steel. Not all rubber linings are suitable; the free sulfur and filler content should be low. Heating may be by nickel coils or heavily nickel plated coils or immersion heaters. Temperature of operation is 150 deg. F. Piping, pumps, filters, and so on, may be neoprene lined or of nickel or Lucite. Nylon may be used for filter cloths and anode bags.

Good ventilation is required and workmen should wear rubber gloves and avoid direct breathing of the vo-

* Stannochlor is a registered M & T trademark.

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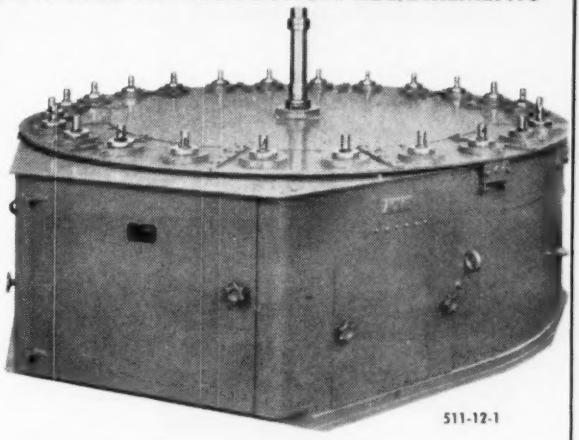

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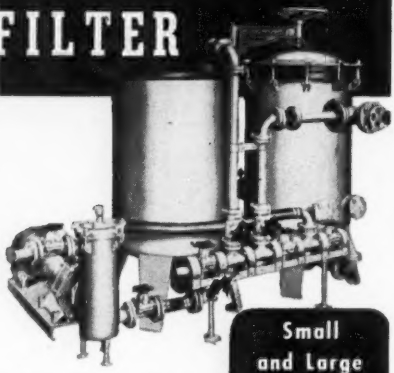

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pors, which contain hydrofluoric acid.

Filtration through activated carbon is essential—continuous if possible; otherwise frequent. Vertical movement of the work during plating is helpful though not necessary; the more usual horizontal rod movement is not recommended.

Separate anodes of tin and nickel are used (approximately equal areas of each) and hung from the same bus bar. Dual anode circuits are not required. Tin anodes should be bagged with nylon, and should be removed during idle periods. Nickel anodes, on the other hand, should be left in the solution until consumed.

The average current density is 25 amperes per square foot, at about 2 to 3 volts. An allowance of 4 volts at a still tank is ample; barrels require more.

Preparing the Solution

The plating tank is filled to two-thirds of its volume with water and the temperature raised to about 150 deg. F. The required amounts of nickel chloride, ammonium bifluoride and sodium fluoride are dissolved, in the order given. After everything is dissolved, but not before, the stannous chloride (Stannochlor)* is added and dissolved with stirring. In a few hours, the solution is filtered through activated carbon. The increase in volume caused by the addition of the salts will probably have brought the solution up to its correct final volume, but if not, water is added. The pH of the solution should now be about 2.5; it can be adjusted by adding pure hydrochloric acid.

The solution must be dummied for a few hours, until satisfactory deposits are obtained, and is then ready for use. If the starting chemicals are not high grade, some preliminary purification steps must be carried out.

During operation the pH of the solution should be between 2.0 and 2.5;

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this may be estimated colorimetrically by means of papers (glass electrode is not suitable in fluoride solutions).

Preparation of Work

Conventional cleaning cycles are satisfactory. As already mentioned, the deposit will be no brighter than the basis metal, which should therefore be well polished if full brightness is demanded.

Operation and Control

The important things are: cleanliness, freedom from impurities, and control of the fluoride iron. Temperature should be controlled fairly closely, 150 deg. F. being the optimum. Constant or frequent filtration through activated carbon will keep the solution free of organic contamination and suspended matter, and care in operation and the use of high quality chemicals and anodes will ensure its freedom from metallic contamination. The bath is a solvent for most metals; work therefore should not be left in the tank with the current off, and extra care should be taken to avoid dropping work into the tank. Purification steps are available to remedy excessive contamination, but the necessity should be avoided as much as possible.

The appearance and brightness of the deposit depend to a great extent on the fluoride content and the sodium-ammonium ratio; and the need for adjustment may be estimated by Hull Cell tests. Fluorides are lost by evaporation dragout, and to a small extent by precipitation of Na_2SnF_6; they may be replaced by addition of hydrofluoric acid, sodium fluoride, or ammonium bifluoride.

At a current density of 25 amp./sq. ft., .0005 inch of tin-nickel alloy is deposited in about 15 minutes.

Stripping is usually unnecessary, since rejects may simply be replated. When essential, the deposit can be stripped in concentrated phosphoric acid at temperatures from 275 to 400 deg. F. This reagent does not attack copper or brass, but will etch steel.

Analytical methods for tin, nickel, total fluorine, free hydrofluoric acid, and for sodium and ammonium are available.

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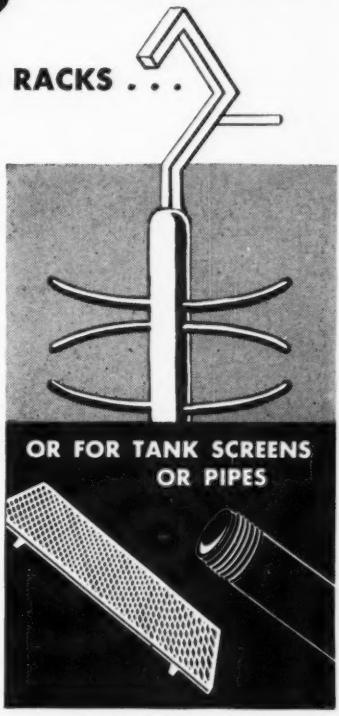
Practical Nickel Plating. Bulletin No. 77, a 44-page general publication with over 40 illustrations, tables and charts, provides the designer, specifying engineer and user with basic information on electroplating and detailed information on nickel plating and its practices. A keyed bibliography suggests 41 sources of additional reading for those who want greater detail or have special interests.

In this publication, available from the International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., recommendations are made on preparation of basis metals, recognition and correction of plating difficulties and purification of solutions. Thickness and type of nickel deposit for adequate service life in many corrosion resistant, industrial and electroforming applications are discussed.

Extra ways to save with Coating 218X

NOTHING BETTER FOR RACKS . . .



Users of Coating 218X know this green plastisol can't be beaten for rack protection They've seen it stand up in all plating and anodizing baths, the toughest cleaners, even vapor degreasing cycles. Bumps, abuse, abrasion – all taken without damage by this flexible, shock absorbing, thick coating. In short, it gives them more rack protection, with less maintenance, and therefore the least cost.

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- **drain boards**
- **conveyor hooks**
- **tote boxes**
- **anode hooks**
- **tank linings**
- **plating barrels**
- **flexible cable**
- **hand tools**
- **heat exchangers**

Coating 218X will work for you in more ways than one–to save money, equipment, time. Ask us about it.

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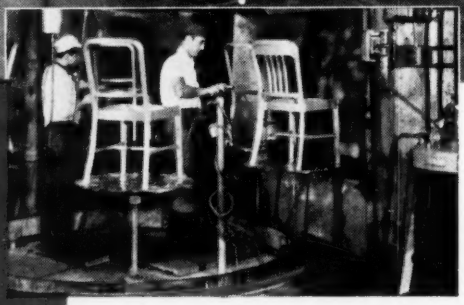

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For instance, the Forbes Finishes Division has furnished the General Fireproofing Company of Youngstown, Ohio, Pittsburgh Industrial Enamels for many years to make its products look better and last longer. Recognized as the world's largest manufacturer of metal desks and office chairs, General Fireproofing is famous also as the maker of one of the finest complete lines of steel and aluminum furniture for trains, buses, steamships, hotels, banks, and other installations.

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Sulfur Dioxide Corrosion Resistance Test

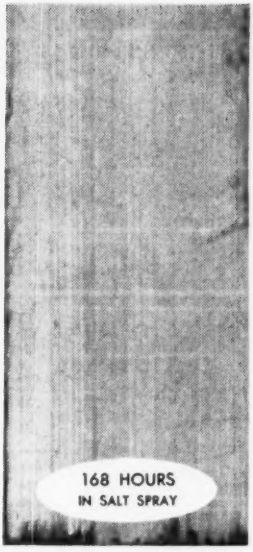
FINISHING technologists are always interested in new methods for testing the corrosion resistance of protective coatings. A series of tests carried out in several laboratories by the British Iron and Steel Research Association has shown that the recently developed sulfur dioxide test for protective coatings gives reproducible results and fair correlation with the results of outdoor atmospheric exposure. Details of the results, which were recently given in the Second Report of the Methods of Testing (Corrosion) Sub-Committee in the "Journal of the Iron and Steel Institute," suggest that the sulfur dioxide test should form a useful addition to Provisional British Standard 1391 (test standard).

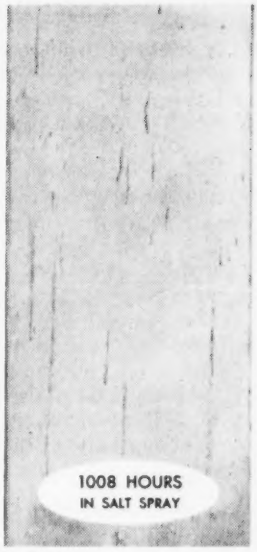
The C. R. L. sulfur dioxide test consists essentially in exposing specimens inside a covered beaker containing a dilute solution of sulfur dioxide. Condensation of the moisture on the specimens is brought about by an electric heater, controlled by a thermostat and a cooling coil. Before the specimens were exposed to tests all the protective coatings were damagd by scratching and indentation.

The apparatus used for the C. R. L. tests consists of a five liter beaker fitted with a lid from which twelve 6 by 2-inch specimens were suspended radially inside it. The beaker is placed on an electric heater controlled by a thermostat

By DR. ALLEN G. GRAY

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry





SALT SPRAY TESTS SHOW CORROSION RESISTANCE

Panel of bare 245T Aluminum, untreated. Extensive corrosion after 168 hours in salt spray.

Panel of bare 245T Aluminum, treated with Bonderite 710. No corrosion after 168 hours in salt spray.

Panel of bare 245T Aluminum, treated with Bonderite 710. In excellent condition after 1008 hours in salt spray.

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Bonderite 710 produces an amorphous chromate coating on aluminum surfaces. It can be applied by spray, immersion, or brush, on sheets, castings, forgings and extruded and rolled forms. It operates at low temperatures and is sludge-free.

Bonderite 710 is a liquid—safer and easier to handle, easier to use, more positive in results.

This product's performance equals (*exceeds*, in most important requirements) the government specifications for chemical treatment of aluminum and its alloys.

For bare corrosion resistance, or as a corrosion-resistant base for paint, investigate Bonderite 710 for aluminum.

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inserted through a central tube. A lead coil is wrapped around the lower part of the beaker and cold water is circulated through it to promote internal condensation. Ten of the test specimens were of mild steel of autobody quality. Of these, one was an unprotected "blank," and the other nine carried different protective schemes including phosphatizing and painting, and metallic coatings of aluminum, lead, tin, and zinc, both bare and painted. The remaining two specimens in the test chamber were of sprayed aluminum on aluminum and sprayed zinc on zinc. The paint used in the tests was an off-white priming paint for dipping and baking applications, based on an oleoresinous vehicle with lithopone and titanium dioxide pigments. It was applied by dipping and the specimen was baked for 20 minutes at 350 deg. F., after draining for about 20 minutes.

The procedure adopted in the subcommittee's tests was the same for all laboratories participating in the program. The tests were started on a Monday morning by pouring 500 ml. of distilled water at 150 deg. F. into the beaker. The specimens were placed on the suspension hooks, leaving their lower edges about 1½ inches above water. Five ml. of sulfur dioxide solution (0.32 gm. of SO_2/100 ml.) of water were added to the beaker at the beginning and end of each full working day, and the entire solution was replaced each Monday morning by distilled water. The thermostat was placed about 1½ inches above the solution and was set to 113 deg. F.; the corresponding temperature of the solution was 150 deg. F. The thermostat, cooling coil, and heater ran continuously over the whole test, lasting 28 days.

To reduce any positioning effect within the beaker, the assembly of specimens was moved clockwise

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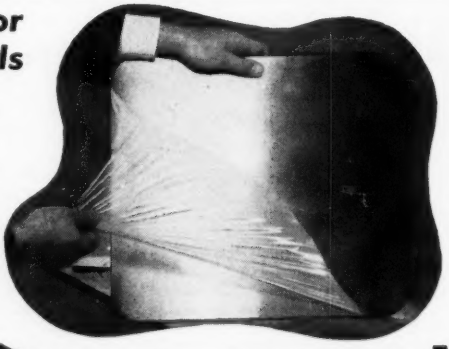

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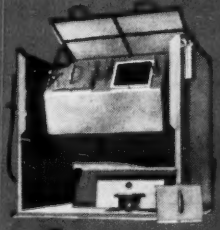

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through 90 deg. each time fresh sulfur dioxide solution was added, and each specimen was turned upside-down or front-to-back once in each working day. The outdoor exposure test and the A. R. E. Salt Droplet Test were conducted on coated panels for comparison purposes. In the former test, specimens were exposed outdoors at an angle of 45 deg. The A. R. E. test involved spraying specimens every day with a salt solution (Provisional B.S. 1391-1947).

In both laboratory tests (sulfur dioxide test and A. R. E. test) the specimens were inspected on each working day. The outdoor exposure specimens were inspected weekly over the first month and monthly for the next five months. Records were made for all tests of the percentage of rusting, blistering, and flaking on the upper undamaged halves of the front and back of each specimen, ignoring a band 3/8-inch wide around the edge. The spread of rusting, blistering, or flaking from the damaged areas resulting from indentation and scratching and from the edges was also measured.

Of interest to finishing engineers was the criteria used by the investigators in determining when a finishing system had failed. The finishing system was judged to have failed when it ceased to satisfy the following points:

1. There shall be no flaking, blistering or other defect of the protective coating, and not more than 5 per cent (by area) of rust and rust stains on the upper undamaged half of the front or back surface of the specimen.
2. On or at the scratches, no rust or rust stain shall extend at any point beyond 1/6 inch from the original boundaries of the scratches. The portions of the scratches lying within 3/8 inch of the bottom edge shall be ignored.
3. On the protruding surface of the

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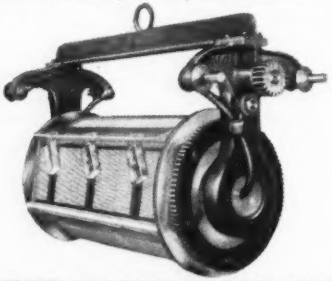

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impact dome, resulting from the indentation produced on the test panel, rust or rust stain and any flaking, blistering, or other defect of the protective coating shall not extend beyond ¼ inch from the center of the indentation.

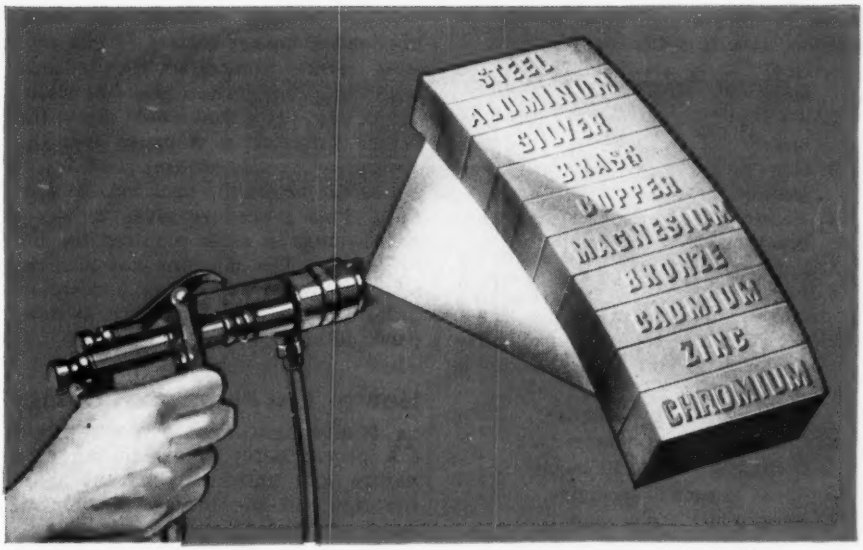
The results of these tests indicated that the C. R. L. sulfur dioxide test should prove a useful addition to laboratory tests for corrosion resistance. It is simple to carry out and was reported to be less affected by the personal factor than the A. R. E. Salt Droplet Test. The sulfur dioxide test appeared to simulate attack by an industrial atmosphere better than the salt droplet test and the latter appeared to be more representative of mildly corrosive conditions. The investigators reported that the salt droplet test did not corrode metallic coatings as rapidly as the sulfur dioxide test, but it is useful for showing up defective or uncoated areas in some types of coatings such as lead or tin.

* * *

Automatic Bright Dip for Brass Parts

A fully automatic machine is being used for bright dipping brass parts at the plant of the Bastian-Blessing Co., Chicago. According to details of the setup recently given by K. W. Bennett in "The Iron Age" a Frederick B. Stevens machine is being used to handle one ton of small brass parts per hour. The brass parts are handled in Inconel baskets. These are hung from traveling arms that lower and agitate each basket in the cleaning and dipping solutions. The machine's period of rest at each station is about 40 seconds; however, an electromechanical timing mechanism allows tank immersion time to be cut to 5 or 6 seconds.

Parts loaded in baskets swing from rocking arms, move from loading area through tanks, into drying area and finally back to unloading position.



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3. Hot water spray rinse (40 seconds).
4. Pickle—50 per cent (by vol.) hydrochloric acid (90 seconds).
5. Spray rinse.
6. Acid bright dip (12 seconds). A solution consisting of 2 gal. sulfuric acid, 1 gal. nitric acid, 5 oz. hydrochloric acid and 1 quart water is used.
7. Spray rinse (40 seconds).
8. Cold rinse (90 seconds).
9. Dichromate dip (40 seconds).
10. Spray rinse (40 seconds).
11. Spray rinse (40 seconds).
12. Hot water rinse (90 seconds).
13. Drying (160 seconds).
14. Load, unload.

After cleaning, pickling, and rinse, the loaded basket pauses for 34 seconds before immersion in the acid bright dip. This pause allows full drainage of any water that would dilute the bright dip solution. A pause over the tank after dipping ensures good drainage of the bright dip back into its own tank. This procedure gives considerable savings in acids required for the bright dip. The machine has also resulted in manpower saving, and higher unit output in less floor space, as compared to hand dipping.

* * *

How to Test Phosphate Coatings

AN investigation of tests that might prove useful in determining the nature and uniformity of phosphate coatings and the intrinsic protective value of finishing systems incorporating phosphate coatings has resulted in several proposed tests. The British Standards Institution, which has been

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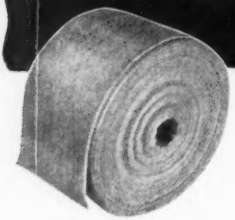

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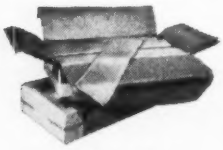

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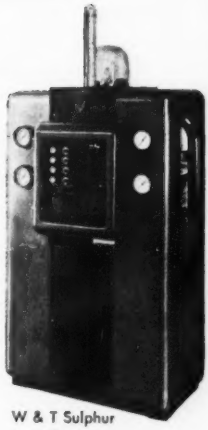

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S-78

active in this work, has considered for some time the possibility of drafting standards for phosphate coatings, with particular reference to their use as a basis for painting steel. Analytical tests for phosphate coatings suggested recently by R. St. J. Preston, R. H. Settle, and J. B. L. Worthington in the "Journal of the Iron and Steel Institute" (British), consist of the measurement of moisture content, absorption, coating weight, hygroscopicity, and the phosphate and chromate content of the coatings.

The recommended size of test specimen was given as a strip 4 by 1½ inches, which may be cut from an article or from a larger flat test panel. Four strips are generally used in each test; when analytical results are given in terms of an area, such as coating weight in grams/sq. ft., the area used for the calculation is twice that of one face of the sample. In determining moisture content, the four strips are weighed and placed in a thermostatically controlled oven at 220 deg. F. for 2 hours. They are then removed to a dessicator and reweighed when cool. The mean loss in weight is recorded as a percentage of the coating weight.

To measure absorption value, strips (usually two strips from the moisture content test) are immersed in diacetone alcohol in a beaker, adding about 450 ml. of liquid to cover the specimens. After 2 minutes, the test strips are removed and drained in a vertical position for 3 minutes. They are then transferred to weighing bottles and the increase in weight per unit area is determined.

Coating Weight

The two test strips used in the absorption measurements, after rinsing in water to remove the diacetone alcohol, may be used in coating weight determinations. The phosphate coating is removed by immersing the pieces

to page 66→

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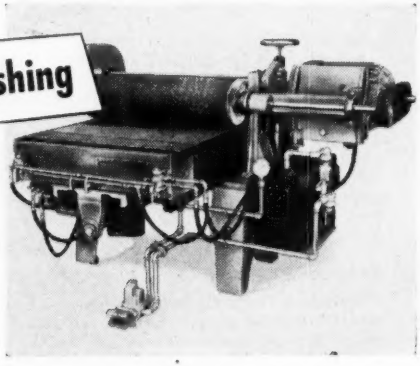

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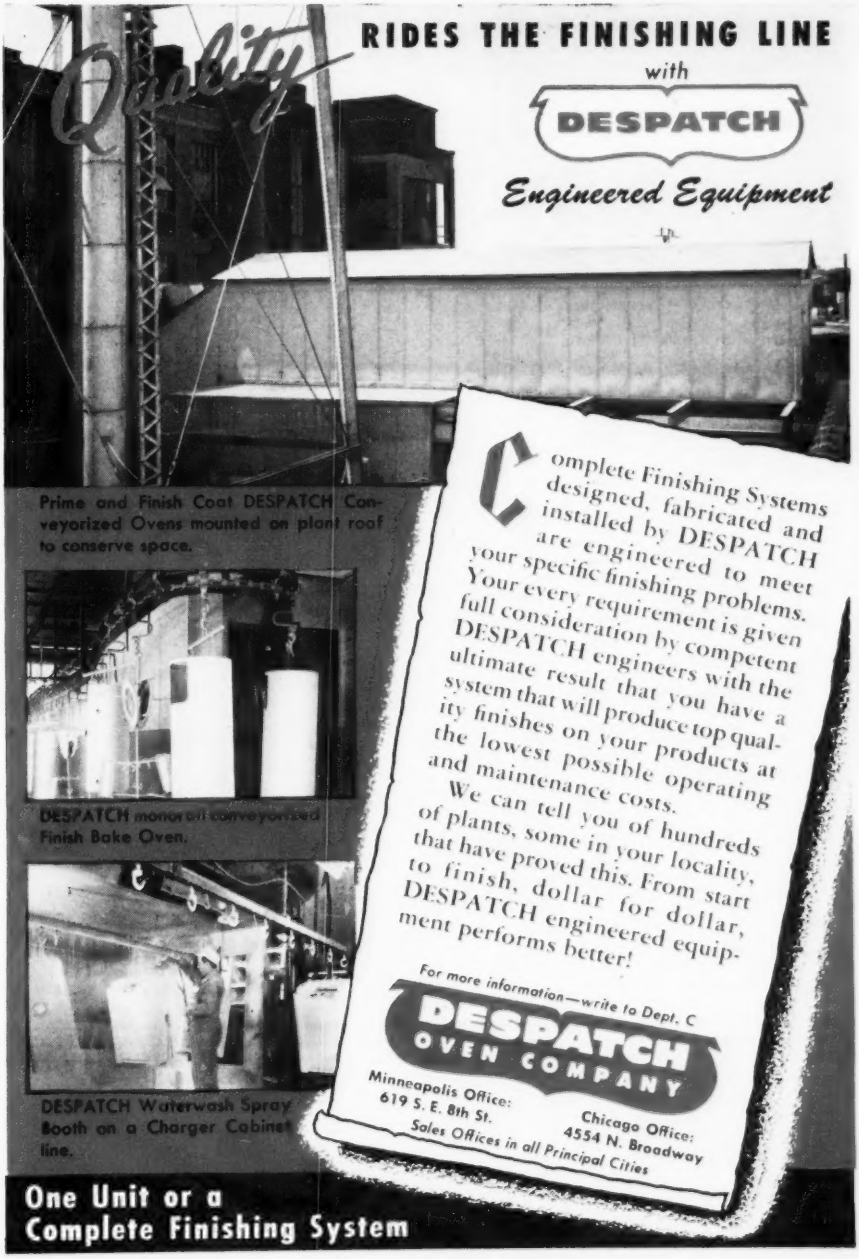
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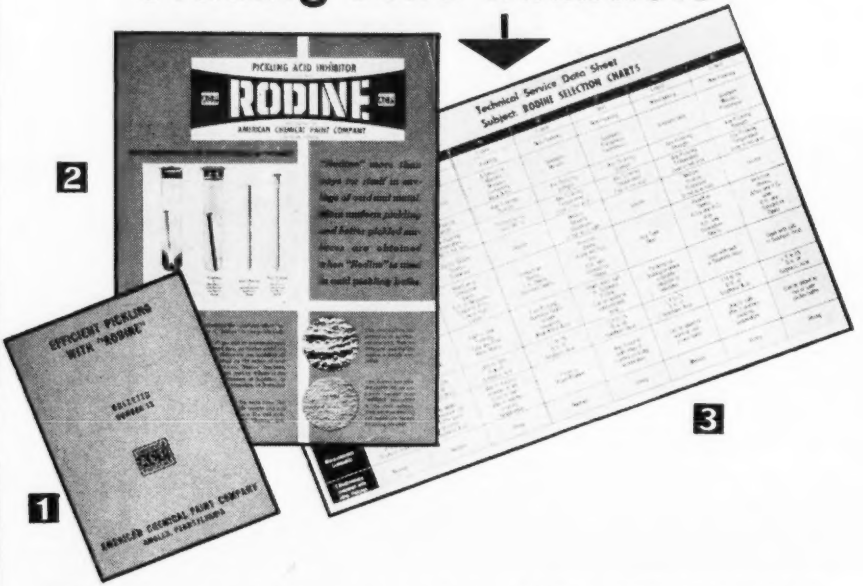

1 The standard reference work on pickling, "Efficient Pickling With RODINE" — Bulletin Number 13 — is now available in a

With RODINE — Bulletin Number 13 — is now available in a new, revised edition.

2 This new 4-page general descriptive folder presents essential information on "Rodine" pickling acid inhibitors.

3 The recently revised "RODINE SELECTION CHART" gives characteristics of and uses for typical "Rodines" used with sulfuric and muriatic acids. Technical Service Data Sheet No. 13-1-1-4.

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in a solution of 15 per cent (by wt.) sulfuric acid to which has been added 0.05 per cent of an inhibitor (di-orthotolyl thiourea was used in these tests). Coating removal is assisted by rubbing the surface with a stiff brush. After the last traces of the coating have been removed, the panels are rinsed in water, dried with filter paper, followed by oven drying at 220 deg. F. for 10 minutes. Test strips are then cooled in a dessicator and weighed. The difference between the original weight of the sample, that is, its weight before it was dried for the moisture content determination, and the final weight after stripping is calculated in grams/sq. ft. of surface area.

The other two strips from the moisture content tests may be used for measurement of hygroscopicity. The test pieces are suspended 2 inches above water level in a large beaker provided with a close fitting cover. Test specimens are allowed to remain in this condition for 6 hours at room temperature. They are then quickly transferred to weighed vessels provided with airtight covers, reweighed, and the gain in weight is recorded as a percentage of the coating weight.

Phosphate and Chromate Content of Coatings

The two specimens used in the hygroscopicity tests may be conveniently used for determination of phosphate content of the coating. The coating is stripped using 1 N hydrochloric acid and rubbing with a glass rod. The stripped specimens are washed and this solution, finally making it up to 250 ml. The phosphate content in the stripping solution is determined by colorimetric comparison with a prepared standard phosphate solution after the addition of ammonium molybdate, sodium sulfite, and hydroquinone to sulfuric acid acidified portions of each.

To determine the chromate content of the coating, test pieces are stripped by dissolving the coating in about 15 ml. of 1:3 sulfuric acid diluted with 20 ml. of water .Then, 5 ml. of nitric acid are added to the strippings and the solution boiled until free from nitrous fumes, following which it is made up to 250 ml. A 50 ml. aliquot is boiled with a few drops of permanganate, the excess destroyed with concentrated hydrochloric acid, and the iron precipitated with sodium carbonate. A suitable aliquot, acidified with sulfuric

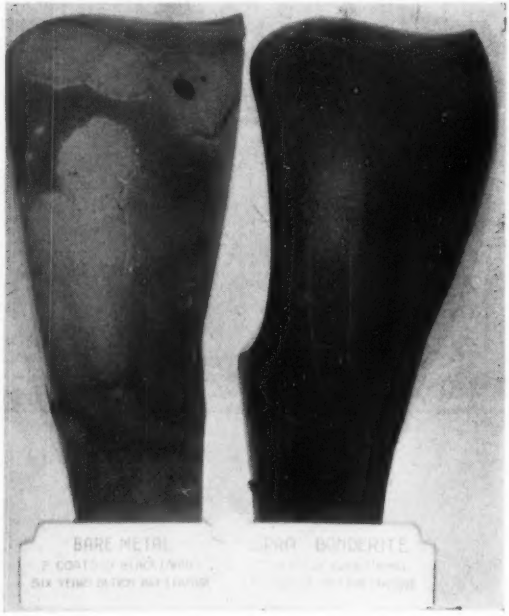
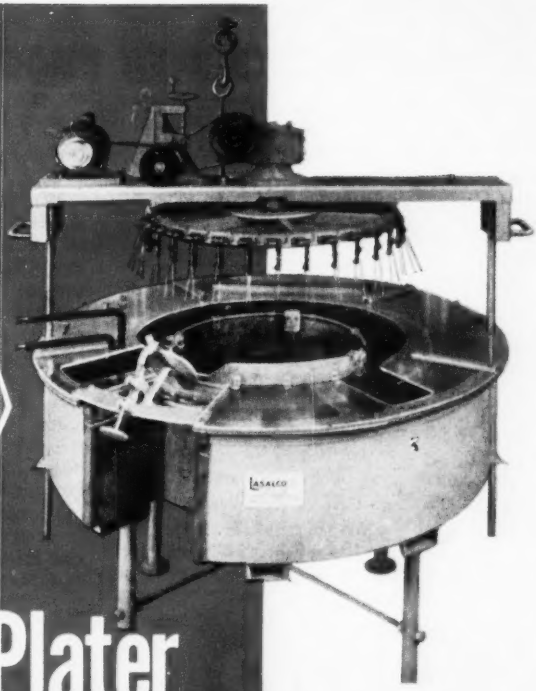


Fig. 1—The results of six years outdoor exposure test on bare steel and phosphate coated ("Spra Bonderite") steel that has been given two coats of black enamel.
(Photo courtesy Parker Rust Proof Company, Detroit 11, Michigan)

Rotating Cathode Boosts Chrome Plating Up To 5700 Pieces Hourly!



LASALCO'S

Circular Chrome Plater

Lasalco's latest chrome plater with its continuously moving cathode offers some extraordinary cost-cutting and time-saving possibilities for increasing your output of pieces up to 3" long. Here are just a few of its many advantages:

- One-man loading
- Fully automatic unloading
- No racks or rack upkeep
- Easily raised driving mechanism and cathode wheel gives quick access to coils and anodes. Any parts dropping into tank can be easily, instantly recovered.
- Unusually high production—5,733 pieces per hour at 13 seconds; 4,188 pieces hourly at 18 seconds; 2,635 pieces at 29 seconds. Minimum output, 420 pieces at 3 minutes.
- Machine is delivered complete, ready to install, and requires only necessary electrical connections and exhaust duct.

Lasalco's Circular Chrome Plater can be a real profit builder. Write immediately for all the details.

SPECIFICATIONS

Cathode Wheel Diameter 30"; 31 Fingers, 3" Centers
Effective Plating Travel 68.4"; No-plate Travel 25.8"
Anode Rods 24" I.D., 36" O.D.; ⅛" Diameter
Center of Anode to Cathode Center 4"
Anodes, Flat 6% Antimonial Lead ¼" x 6", Three 26" Long; Two 24" Long; Two 2" Long; One 5" Long.
Tank Diameter 54"; Depth 14"
Solution Capacity 115 Gals., 2" From Top
Heating: ⅜" I.D. 6% Antimony Lead Steam Coil
Drive: ¼ H.P., A.C. Motor; Variable Speed Reduction

LASALCO, INC.

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acid in a Nessler tube, is treated with diphenyl carbazide. A solution of N/1000 potassium dichromate is added to a blank until a color match is obtained. From the volume used, the percentage of chromic acid in the coating weight can be determined.

Performance Tests

The Phosphate Coatings Panel of the British Standards Institution has used the A.R.E. test and the C.R.L. test as well as outdoor exposure to evaluate phosphate coatings on a performance basis. The A.R.E. test consists of spraying the specimens once a day with sea water, so as to cover them with a layer of discrete droplets. Evaporation of the droplets between sprayings is minimized by storing the specimens over water in an enclosed space. In the C.R.L. test, specimens are suspended inside a beaker over 500 ml. of dilute sulfur dioxide solution. The apparatus is constructed so that condensation is produced on the surface of the test panels. Figure 1 shows the results of outdoor exposure tests on phosphate coated steel conducted by the Parker Rust Proof Company.

Astrology and Colors

Man has always been convinced that his destiny is ruled by divine forces within the sky. Over two thousand years before Christ, astrology was an important science. The Egyptians called time "the everlasting green one." Much of early architecture involved color symbolism referring to the sun and planets. The great temple of Nebuchadnezzar at Barsippa was built with "painted" sections dedicated to the seven planets or heavenly spheres, and these "battlements" were black, the "color" of Saturn; the next, orange, the color of Jupiter; the third, red, emblematic of Mars; the fourth, yellow, color of the Sun; the fifth and sixth, green, and blue respectively, dedicated to Venus and Mercury, and the last or upper sec-

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tion white, being the color associated with the Moon whose place in the Chaldean system would be uppermost.

Following these ancient and legendary references with certain laboratory checks and historical research, researchers at the Color Research Laboratory of the Sun Chemical Corporation, New York, have unearthed many curious and significant facts about colors, symbolisms, and their applications in astrology and religious customs.

Not all astrology, for example, was devoted to the intangible and inexplicable mysteries of human fate. The Chinese were quite practical about the messages they read in the heavens. If Saturn appeared white and round, mourning and droughts were in store. If the planet was red, disturbances were to be expected and troops might take to the battlefield. If it was green, there would be floods. If black, sickness and death might descend upon the land. And if yellow, China would see prosperity! Mercury also forecast drought when it was white; when yellow, the crops would be scorched. When red, an enemy would attack; when black, floods were imminent. There were other variations in this color index of fate, disaster, and good fortune. Green clouds were omens, for example, of a plague of locusts. Yellow clouds heralded prosperity.

The "Zodiac" derives from the Greek *zodiakos kuklos*, meaning "circle of little animals." Each sign of the zodiac had its own symbol and color, and each was thought to influence the life of every human being.

Temperature Control Manual. The Partlow Corporation, New Hartford, N. Y., has published a new edition of its **Bulletin No. 101** titled "The Design and Process Engineers Guide to Industrial Temperature Measurement and Control." This 24-page two-color manual—available without charge to process engineers, plant managers, design engineers, and heating engineers — presents the basic principles of industrial temperature control in practical fashion. It defines different types of control systems and distinguishes between them so that the engineer can select the type most suited to a particular application.

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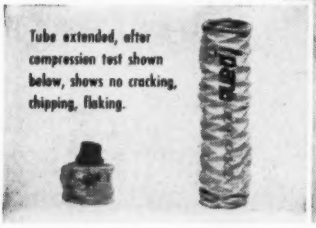

BIG SQUEEZE won't mar this finish

Ever squeeze a tube of shaving cream or tooth paste and have the paint flake off? That's what happens when ordinary finishes are used.

Sun Tube Corporation solved the problem for its customers. A Sherwin-Williams custom finish, applied under controlled conditions, practically fuses with the metal. The "big squeeze" you see here is proof . . . a myriad of accordion-like bends and sharp corners, yet the finish remains intact. Also, it has excellent chemical resistance.

Maybe you have a similar problem where flexing causes finish deterioration. Or perhaps you have a different problem, which can be solved with a specially formulated coating. Your Sherwin-Williams representative can offer qualified help . . . can bring you Sherwin-Williams' broad experience in providing the right finishing materials for widely varying requirements.

Ask him, too, about Sherwin-Williams identification aids—tags, seals or decals to help you feature the finish as a quality sales "plus". Or write for booklet B-767, "How to Make the Finish Help Sell the Product." The Sherwin-Williams Co., General Industrial Division, Cleveland 1, Ohio.

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Get the facts about this top-quality, versatile industrial enamel. It's one of a complete line of Sherwin-Williams product finishes especially developed to meet production-line requirements. Check the classified telephone directory for location of nearest Sherwin-Williams Branch—ask for brochure KL-511. Or write The Sherwin-Williams Co., General Industrial Division, Cleveland 1, O.

Services of trained industrial finish specialists available in your area through nearest Branch

G.E. Announces A Complete

RECTIFIER STACKS have much longer life. Selenium stacks exactly like those used in unit have already lasted over 60,000 hours. Copper-oxide rectifiers, operated at proper rating, last almost indefinitely.

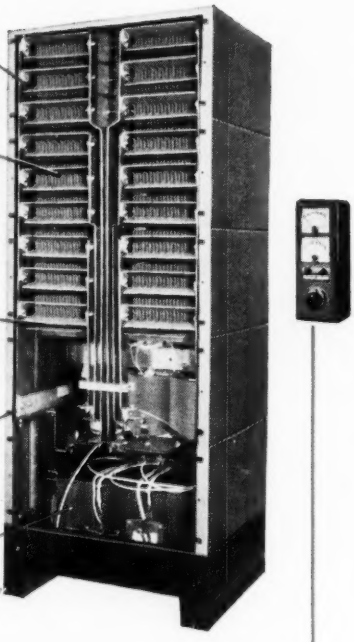
PROTECTION Transformer coils are protected against corrosive atmospheres by heat impregnation. Acid-resistant paint protects rectifiers. Oil-immersed selenium stacks are available for thorough protection against severely corrosive conditions, when required.

FORCED AIR COOLING Fan draws air in from the front of the unit, across and down over the stacks, transformer and saturable reactor. This design avoids dust and dirt intake, and permits solid top for protection against dripping.

BUSBARS Heavy busbars are arranged for line-up mounting of several units. They are brought out at the rear of the casing near the bottom in floor-mounted models.

SENSITIVE CONTROL is achieved by the use of a saturable reactor to control output without the use of any resistors, It is employed on manually and automatically regulated power systems. Latest developments in magnetic amplifier design are used for regulating circuit.

STURDY CONSTRUCTION Casing on floor-mounted units is 14-inch sheet steel and expanded steel screening. Base is reinforced by steel members and designed for moving by fork truck. Front and rear panels are easily removable.



CONTROL STATION Designed for wall mounting either beside the tank or power supplies, the operator's control station is provided with manually controlled and automatically regulated power supplies. It includes voltmeter, ammeter, voltage level control device, and START–STOP push buttons where specified.

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BARREL PLATERS

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New Plating Rectifier Line

ALL RATINGS OFFER INCREASED EFFICIENCY AND CONVENIENCE AT LOWER PRICES

General Electric's new complete line of plating rectifiers includes manually controlled and automatically regulated power supplies, as well as equipment for barrel plating and precision laboratory work. Lower in price, the new line also offers both greater economy and more convenience in operation.

NEW EASE OF OPERATION A separate operator's control station controls the entire d-c output of the system, regardless of the number of individual units employed. Saturable reactor controls are used on manually and automatically regulated power systems for precise regulation and quick response.

NEW FLEXIBILITY Manually controlled units can be converted at any time to automatic regulation of current, voltage, or for anodizing, by the addition of an automatic regulator.

NEW OPERATING ECONOMY By using either selenium or copper-oxide rectifier stacks, depending on which is more efficient for desired rated output, and by using proper circuits, much greater operating efficiency has been obtained. This means you get greater operating economy now and in the future.

EXTREMELY LONG LIFE Selenium stacks identical to those incorporated into these new plating rectifiers have already lasted over 60,000 hours on test. Life of copper-oxide rectifiers operated at proper rating is almost infinite. Special acid-resistant finishes protect stacks, transformer and components against corrosive atmosphere.

ALMOST NO MAINTENANCE The cooling design of the equipment takes air in from the front, across and down over the components, to minimize dirt and dust intake. The fan is the only moving part in the entire unit, and it requires only occasional lubrication.

MORE INFORMATION is yours for the asking. See your nearest G-E Plating Rectifier Agent or G-E Apparatus Sales Office, or write Section 464-12E, General Electric Co., Schenectady 5, N. Y.

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Electric Shavers Degreased By Ultrasonic Process

FIRST commercial equipment employing the Soniclean Process has been purchased from Detrex by the Electric Shaver Division of Remington Rand, Inc., Bridgeport, Conn. Fully conveyorized, it is the largest commercial unit ever built for ultrasonic cleaning. Detrex officials point out that the new equipment will permit the precision cleaning of shaver heads at a rate never before equalled by comparable cleaning methods.

Ultrasonic cleaning is particularly adaptable in cases where exceptional cleaning quality is required or where parts have fine openings, crevices and other hard-to-clean forms. In regular degreasing equipment, the Soniclean Process will be added to the cycle for the maximum refinement in cleaning a part to meet rigid standards.

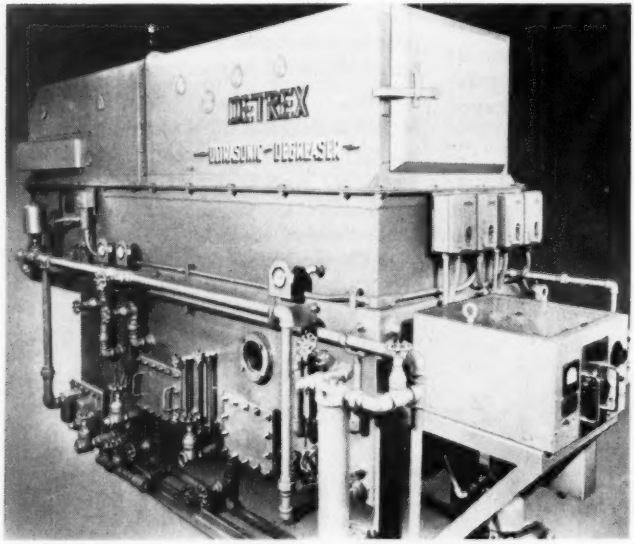


Fig. 1 — New, fully-conveyorized, ultrasonic degreaser developed by the Detrex Corporation of Detroit for the Electric Shaver Division of Remington Rand, Inc. Final cleansing of parts by the use of ultrasonic waves is incorporated in the regular degreasing cycle. The equipment shown here is more than six feet high and 12 feet long. Note high frequency generator at right.

Wash Primer Employed in Finishing Metal Office Partitions

A NEW and economical metal pretreatment prior to painting movable steel office, laboratory and industrial partitions is based on Vinylite resins that inhibit rust and improve quality

of the finish. Serving as both a metal conditioner and wash primer at the same time, this new pre-treatment is based on Vinylite resins to resist rust and corrosion, and improve the durability and adhesion of finish coats. Excellent adhesion for almost all types of baking enamels and primer surfacers results in less chipping or scratching of the finished product in place or in transit. Full wall or low-height, metal office partitions, produced by Virginia Metal Products Corporation, Orange, Va., have a three coat system developed by John L. Armitage and Company, Newark, N. J., consisting of the new wash primer based on Vinylite resins, primer surfacer and semi-gloss baking enamel. Use of the wash primer improves both quality and durability of the finished partitions. Easy to apply by brush, spray, roller coat or dipping, an extremely thin film of the wash primer approximately 0.1 to 0.3 mils thick is employed. The new wash primer fits easily into conveyorized production with a drying time of 15 minutes, or one minute under infra-red or other force dry equipment. The rust inhibitive and anti-corrosive properties of the Vinylite resin-based wash primer eliminate blistering of enamel topcoats even under extreme conditions of humidity, salt air or moisture, and scratches in finished surfaces will not rust under the enamel. Where insulation in the metal panel prevents the use of a water wash system, the new wash primer can be used.

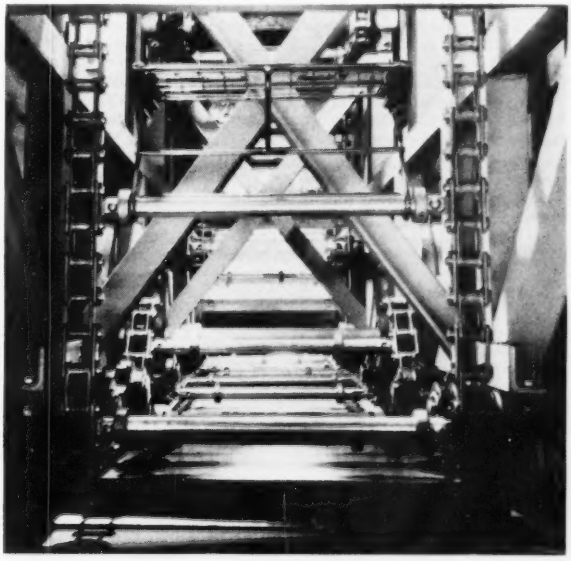


Fig. 2 — An interior view of the fully-conveyorized, ultrasonic degreaser in use at the Electric Shaver Division of Remington Rand, Inc. Tray in the foreground can hold 50 shaver heads for ultrasonic degreasing. The removable trays have been designed for parts handling and easy stacking.

NEWS of the Industry

NEW PLANTS

THE GEORGE L. NANKERVIS COMPANY, manufacturer of metal finishing equipment for the automotive and aircraft industries, has announced the completion of its third expansion program in the past three years. The latest expansion includes a new manufacturing plant and additional engineering facilities.

Located adjacent to the main facilities, the new one story plant provides over 10,000 square feet of manufacturing space. The new building was designed to facilitate the rapid fabrication of metal finishing equipment, such as plating tanks, racks, and so on. It is equipped with two 10,000 pound bridge cranes which cover the entire working area.

New equipment in use at the plant includes: arc, heliarc and acetylene welding equipment, iron workers, nibblers, brakes, shears, punch and hydraulic presses and allied equipment.

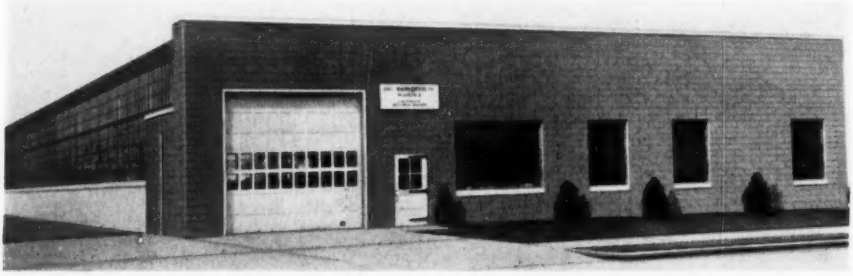
Engineering facilities have been increased by the equipping of an additional 3000 square feet of engineering space in a new building near the main plant. Engineering capacity has been doubled, both in area and personnel, to meet the increased volume handled by the company.

An ample supply of epichlorohydrin for both the present and future needs of the nation is assured by a new epichlorohydrin plant which **Shell Chemical Corporation** has just brought on stream in Houston, Texas, according to an annoucement by Mr. Jan Oostermeyer, president of the company.

Epichlorohydrin has recently become a key chemical product. Not only is it a major component of epoxy resins, but it is also used in adhesives and chemical intermediates, and as a stabilizer in insecticides.

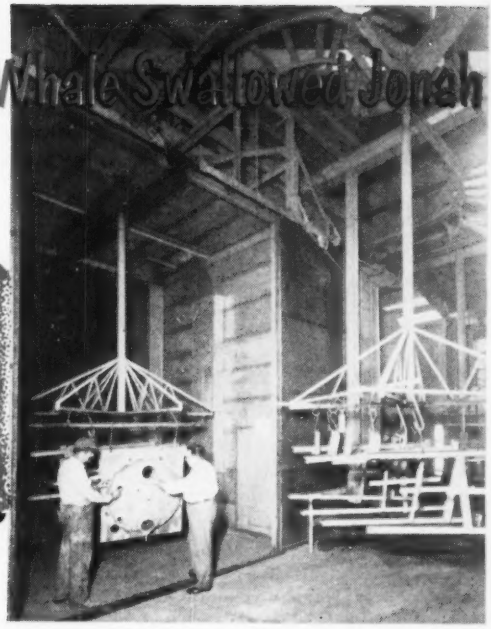
Mr. Oostermeyer stated that expansion of the market had necessitated Shell Chemical's current three-fold increase in production facilities. The new plant incorporates several processing improvements.

The raw material for epichlorohydrin



New plant addition of George L. Nankervis Company.

PD—and the Whale Swallowed Jonah



This PD Finishing System Can "Swallow" Parts Up To The Size Of A Small Tank Car!

In this important plant an efficient, yet space-saving, Painting Unit was required to handle parts of varying sizes—small to enormous. It had to have capacity. Peters-Dalton Engineers solved this need—laid it out with an overhead conveying loop installed at a height that left close to 20 feet for parts-passage. In spite of its vast size, this complete PD Finishing Installation incorporates all the features that are included in systems handling average sized products

PD engineering experience and production ability insures thorough analysis of your problems. Any type Finishing Equipment can be designed for your special requirements . . . efficiently, trouble-free. Ask for catalog or we'll be glad to tell you more if you—write, wire or phone.

Hydro-Whirl Paint Spray Booths *Industrial Washing Equipment*
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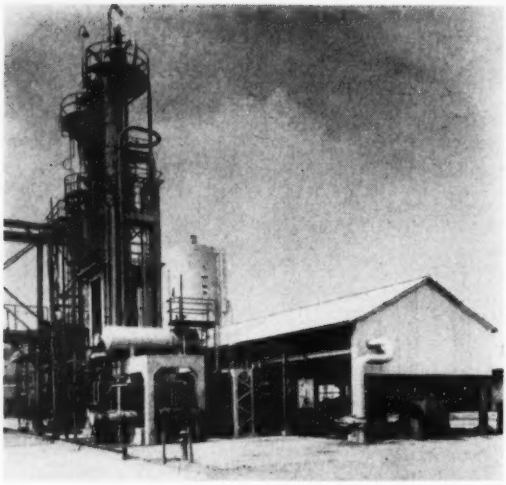


The epichlorohydrin plant of Shell Chemical Corporation at Houston, Texas.

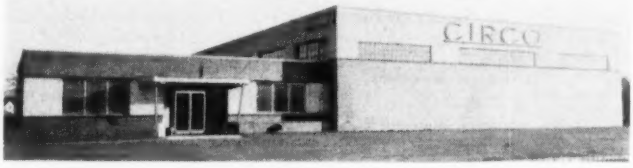
is allyl chloride of which Shell Chemical is a major producer. The allyl chloride is made from propylene secured from oil refinery operations and plays a major role in Shell's overall glycerine production at Houston.

Mr. Oostermeyer also reported that a part of the new epichlorohydrin production will be tied in with the expansion of Shell Chemical's facilities for manufacturing Epon resins.

TOPPER EQUIPMENT COMPANY, manufacturer of Circo vapor degreasing equipment, metal parts washers, dryers, solvent recovery stills, steam cleaners, Circo-Solv (trichlorethylene) and Per-Solv (perchlorethylene) has completed and moved into a new and modern manufacturing plant at Rahway, New Jersey.

The 40,000 square foot new building was constructed especially for Topper's requirements in the manufacture of Circo metal cleaning equipment. It includes such special facilities as metallizing and blasting rooms, traveling craneways, and thick concrete floors for the type of equipment required.

The plant is located adjacent to the famous New Jersey Turnpike and the Garden State Parkway, on the Lehigh Valley Railroad.



New plant of Topper Equipment Company.

The MW Protective Coatings Division of **METALWELD, INC.**, has installed in the new Scotts Lane Plant, one of the largest rubber vulcanizers in this area for the joining of hard and soft rubber sheets to steel. It is reported that this vulcanizer will accommodate tank lining jobs up to 12 ft. in diameter by 26 ft. long. A continuous graphical record of the temperature and pressure is made of each cure.

RAYBESTOS-MANHATTAN, INC., has moved from 445 Lake Shore Drive into its newly constructed Chicago office and warehouse building at 6010 Northwest Highway. The new building provides expanded facilities for warehousing mechanical rubber, packings and asbestos textiles and for Chicago sales offices of these products, as well as national sales headquarters for the Equipment Sales Division.

COMPANIES

Two papers presented before the Ninth Annual Conference of the National Association of Corrosion Engineers by

28 Years of Experience In Sale and Service of

CHEMICALS TO CLEAN and PREPARE METAL for PAINTING

Surphos — CLEANER and PRODUCER OF PHOSPHATE COATINGS.

Sol-Klean — PHOSPHORIC ACID RUST MOVER AND ETCHER.

Industro — ALKALI CLEANERS, STRIPPERS and AIR WASH COMPOUNDS.

Industrosolv — SOLVENT EMULSIONS FOR SPRAY WASHING MACHINES.

SOL-KLEAN prepares steel and aluminum for painting, removing rust, oxide and oil. It etches the metal and gives a thin phosphate coating. One volume of Sol-Klean, diluted with 3 volumes of water, usually brushed on the metal at room temperature. It penetrates oil and dissolves rust. Sol-Klean is removed together with the dissolved oil and rust by wiping with rags or flushing with water. Metal may also be cleaned and treated by immersion in hot Sol-Klean and rinsing in water. Sol-Klean is non-inflammable and evolves no toxic or corrosive fumes.

SURPHOS cleans and produces a phosphate coating on sheet steel, machined and cast iron. It anchors the paint finish and increases its humidity and salt spray resistance. Use hot (one ounce per gallon solution) in Power Wetting Machine or dip tank. Acid proof equipment not needed.

NOTE:

Consult Us On Your Government Specification Requirements

INDUSTRIAL CHEMICAL PRODUCTS COMPANY

3778 BELLVUE AVENUE **DETROIT 7, MICHIGAN**

Representatives In Principal Cities

IN CANADA, MADE AND SOLD BY BOYLE CHEMICALS LTD. LONGBRANCH, ONT.

ALUMINUM COMPANY OF AMERICA scientists, indicated that aluminum has achieved a new record in withstanding atmospheric weathering and corrosion.

The first paper, by C. J. Walton, D. O. Sprowls, and J. A. Nock, Jr., covered the results of a quarter century of world wide research. Service installations of aluminum that had been exposed to the atmosphere as long as 52 years were covered in the research findings; controlled test specimens have been exposed at weathering stations for as long as 20 years.

The report proved conclusively that aluminum alloys are highly resistant to corrosion after such long periods of exposure.

W. W. Binger, R. H. Wagner, and R. H. Brown discussed the resistance of aluminum alloys to chemically contaminated atmospheres in the second paper. Proven is aluminum's high resistance to corrosion by a wide variety of chemicals. Greater use of aluminum in the chemical industry and by concerns in highly industrialized areas is thereby forecast.

Warehousing facilities for the metal finishing chemicals of **ENTHONE, INC.**, New Haven, Connecticut, in Cleveland, Ohio, were established by the appointment of R. O. Hull & Company, Cleveland, as exclusive distributor of Enthone products in the states of Ohio and West Virginia, the western portion of Pennsylvania, part of western New York including the Buffalo area, and northeastern Kentucky.

R. O. Hull & Company has been distributing Enthone products for many years in Ohio. The recent change in policy will result in making Enthone products more available over a wider area and will extend the Enthone service to this area since R. O. Hull & Company engineers will be assisted by an Enthone service engineer, Joseph E. Rhoads, who will make his headquarters at the Cleveland offices of R. O. Hull & Company.

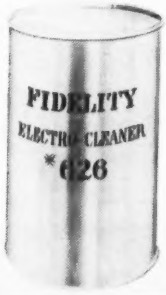
Ardco, Inc., Chicago, Illinois, has been appointed as exclusive distributor of Enthone products in western Michigan and the state of Indiana in addition to its former territory of Illinois, Wisconsin, Iowa and Minnesota. Enthone service will be extended to this area by Robert Goodsell of Enthone, Inc., whose headquarters remain at the Ardco, Inc. Chicago offices.

Distribution of Enthone chemicals in

Fidelity

ENGINEERED COMPOUNDS

FIDELITY
ELECTRO-CLEANER No. 626



FIDELITY ELECTRO-CLEANER No. 626 is a free-flowing, white, alkaline compound. Designed specifically for the cleaning of copper, brass, zinc, aluminum die castings, white metals prior to plating, it has also been used successfully as a steel cleaner.

Special cleaning instructions are provided for each different metal cleaning job and assure the most efficient cleaning performance possible for each type of metal.

Write, detailing your metal cleaning problems. Our Laboratory Staff will be glad to make recommendations . . . no obligation, of course!

for

METAL FINISHING & PLATING

SPECIALISTS IN METAL CLEANERS AND PAINT STRIPPERS

FIDELITY CHEMICAL PRODUCTS CORP.

470 Frelinghuysen Avenue, Newark 5, New Jersey

prior to MACHINING

prior to PLATING

METALWASH designs and manufactures washing, pickling, drying, and phosphating machinery for the widest range of applications.

prior to PAINTING

prior to HEAT TREATING

prior to ENAMELING

METALWASH
MACHINERY CORPORATION

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KEEP SPRAY BOOTHS SAFER FROM FIRE!

WITH NON-INFLAMMABLE

BOOTHCOTE #4

FOR DRY WALL BOOTHS

PERFECT LUBRICANT FOR FORMS

BOOTHCOTE #5 FOR WATER WASH BOOTHS

PERFECT RUST PREVENTATIVE

INSIDE STORAGE—OUTSIDE STORAGE

Makes frequent cleaning easy. Pre-mixed, ready to use, safe to store. Saves time, labor, no flaking off. Spray or brush on clean booth. When desired, operator peels off overspray in sheets. Advocated by insurance companies.

MONEY-BACK TRIAL OFFER: 5 gals. $6.25

KLEENCOTE WATER WASH COMPOUND

BREAKS UP PAINT—NO CLOGGED UP SYSTEMS

HYGRADE'S STERLING CREME
HYGRADE'S SKIN GUARD

protects hands, face and arms from paint, grease, ink, etc. penetrating skin. Soil washes off easily without harsh solvents or cleaners. Paint and grime washes off. Reduces blackheads and skin blemishes. **12 — 7 oz. Jars — $6.00**

HYGRADE'S STERLING CLEANER
HYGRADE'S HANDY SOAP & CLEANER
(WATERLESS HAND CLEANER)

dissolves grease, grime, fresh paint, tar, printers' ink, shellac, mastic cement, etc. without water. Use for cleaning refrigerators, ranges, etc., before shipping. **12 — 14 oz. Jars — $7.08**

All prices f.o.b. Buffalo

HYGRADE

FOOD PRODUCTS CORP.

Industrial Div., 18 Stetson St., Buffalo 6, N. Y.

Canada and warehousing of many products will be handled by Armalite Company, Ltd., Toronto, Canada. Active coverage of the provinces of Quebec and Ontario is accomplished by the sales engineering staff.

M. A. Glaser

M. A. Glaser, vice president and technical director of **MIDLAND INDUSTRIAL FINISHES COMPANY**, Waukegan, Illinois, recently delivered an interesting lecture entitled, "Industrial Finishes — Present Trends And Future Prospects," at the Harvard Graduate School of Business Administration as part of the Third Decennial Paint and Varnish Production Club.

Mr. Glaser pointed out that great strides in the industry have been made during the past 25 years. He also predicted that the next decade would see wide use of latex polymers in industrial finishes, silicone coatings for heat, weather, and chemical resistance and new polyester resins of wide compatability.

"The Norton Story," the first full-length history of **NORTON COMPANY**, was recently distributed to company employees.

Authored by Mildred McClary Tymeson of Holden, the book was published by Norton's Public Relations department and printed by Commonwealth Press of Worcester.

Work on the book has been going on for the past 2½ years in the course of which the author interviewed over 300 active and retired employees to form the foundation for her story.

It is the story of Norton people, past and present, who by their ingenuity, productivity, loyalty, and good judgment have made the company what it is today.

In his introduction, George N. Jeppson, chairman of the board, dedicated "The Norton Story" to "those men and women of our Norton family who have gone before us—they who left us with the sound

OSBORN

BEFORE: Closeup of helical gear before deburring.

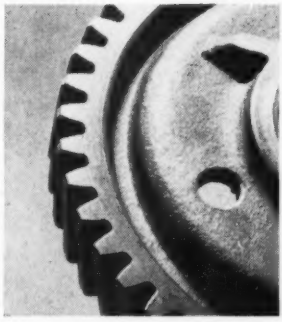
Gone . . . costly thorns in their side

Burr removal by muscle methods is aggravating because it is costly, inefficient and non-uniform in quality. Here's how a truck manufacturer has banished these "thorns in the side" with push-button brushing.

The operation: to deburr, break and blend the flank edges of gear teeth prior to shaving and heat treating. Formerly done with a hand tool, in several operations, the work was tedious and required close inspection and reworking to meet rigid specifications.

Now, an Osborn Brushing Machine in one speedy operation smooths the entire tooth edge . . . produces *uniform blending* of surface junctures of *every tooth*. Result: lower costs and greater precision for *better performance* of the product in service.

Find out how *you* can cut your costs and improve *your* products with power brushing. Call the nearby **O**sborn **B**rushing **A**nalyst or write *The Osborn Manufacturing Company, Dept. O-5, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



AFTER deburring with Osborn Brushing Machine.

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

tradition that in the daily lives of Norton folks, justice and friendship should be the first consideration."

The 1953 sales meeting of the **BINKS MANUFACTURING COMPANY** of Chicago offered branch managers and officials of the associated distributors a chance to discuss their problems man-to-man with all key department heads. E. F. Watts, sales manager, solicited the help of the field force when planning the program, and as a result the lecture-type meeting was abandoned in favor of an informal discussion.

An entire day of the meeting was devoted to a review of main points covered in Binks' 5-Day School of Spray Painting. This was in answer to requests by sales representatives and managers for "more details on product facts and likely new developments."

Field reports also indicated a need for information on how to sell. One day, therefore, was devoted to the basic principles of industrial selling, and how the selling of industrial painting materials is vastly different from the selling of consumer products.

At a banquet climaxing the meeting, Burke Roche, president, indicated that the success of this cooperative type of meeting would set the pattern for future meetings.

It has been announced that a $5,000 grant for aid in the study of oxide film, with a view to growing protective films on metals, has been made by Research Corporation to **STEVENS INSTITUTE OF TECHNOLOGY**, Hoboken, N. J. The gift is called the Harvey Nathaniel Davis Grant in honor of the late president of Stevens.

Robert B. Green, associate professor of physics, who is in charge of the project, described it as the first attempt to use the electron microscope and electron diffraction simultaneously to study the growth and structure of oxide films. The eventual objective of the work is to develop methods of producing oxide films that will protect metals from corrosion. Pure aluminum and nickel form self-protecting oxides naturally, but other metals, notably the iron group, are not protected by their oxides and continue to corrode indefinitely. If oxidation could be arrested near the surface in iron and steel, Dr. Green pointed out, much waste in industry due to corrosion could be averted.

Zinc and aluminum will be studied first, with the prospect of studying iron when techniques are perfected. Aspects studied will include discontinuities, cracks, wrinkles, and the location of these features in relation to the original surface. Fresh surfaces will be produced both by the fracture of single and polycrystalline specimens, and by cleaning of surfaces that have not been subject to

Informal discussion on policy at the recent Binks' sales meeting. Beside branch managers and other sales personnel, key departmental heads in manufacturing and engineering attended this meeting.

FOR THE FINISH YOU LOVE TO SEE

SPEEDIE Buffing and Polishing Compositions are designed for all types of buffing—and coloring on all metals, plastics and wood. There's a *SPEEDIE* Compound for heavy cut, light buffing or coloring to a mirror finish. These compounds have been proved both in the laboratory and on the job to do the most meticulous buffing operation.

USE *SPEEDIE* BUFFING COMPOUNDS

CLEANING IS NO PROBLEM WITH:

SPEEDIE Tripoli—Stainless Steel—Chrome—Nickel Finish—Grease Stick or Emery Cake Compositions. We have the *right* material for the *right* job . . . Write us *on your company letterhead* about objects to be buffed, type of buff used, problem you may now be having and how many bars of *SPEEDIE* Compound you will require for an experimental run. All such requests are given immediate attention.

WRITE TODAY—You'll be gratified at the results with *SPEEDIE* Buffing Compounds.

Photo by Underwood & Underwood

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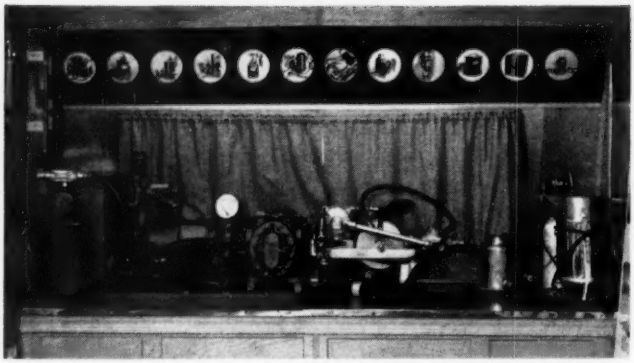


Fig. 2—Carried primarily for in-plant demonstration, the equipment display in Hercules' "Mobile Lacquer Information Center" includes new lacquer spray guns, heaters, gages, and an airless atomization unit. In addition, photographs of all currently available lacquer heaters are displayed.

plastic flow. Dr. Green proposes to grow single crystals of aluminum and zinc, in order to study the effect of crystal orientation.

A unique "Mobile Lacquer Information Center" will be used to bring to the attention of industry throughout the country new developments and improvements in lacquers.

The unusual industrial exhibit, sponsored by **HERCULES POWDER COMPANY,** Wilmington Del., is housed in a custom-built, lacquered, 35-foot trailer completely fitted as a traveling display and application laboratory.

The trailer is equipped with facilities for showing motion pictures, has a conference room and exhibits, which include the latest in lacquer spray equipment. The spray equipment will be moved into plants for on-the-spot demonstrations.

Display panels in the trailer tell the story of important new developments which are expanding the variety of applications for lacquers on both metal and wood surfaces.

Durability, sunlight resistance, rust-resisting primers, military finishing systems, floor finishes, comparative results achieved by four ways of applying lacquer, and aerosol lacquers are some of the subjects of the display panels.

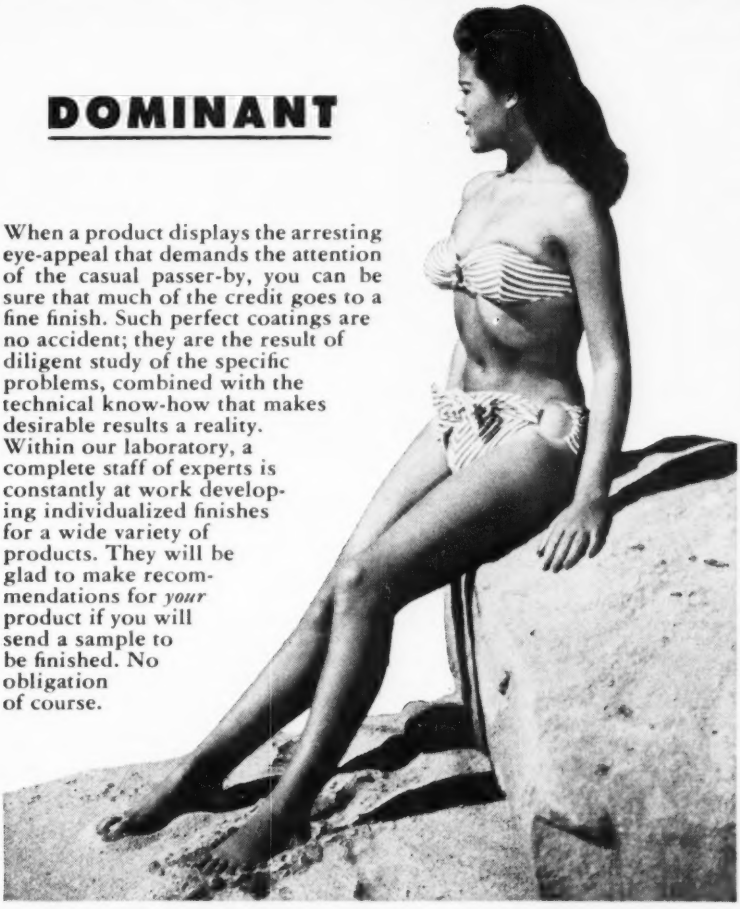
Other panels illustrate the types of coatings which can be formulated with Hercules chlorinated rubber, paper lacquers, and ethyl cellulose specialty lacquers.

The trailer itself is finished inside and out with nitrocellulose lacquers

Fig. 1—The interior of Hercules' new "Mobile Lacquer Information Center" includes an equipment exhibit and display panels which illustrate new developments in lacquers for wood and metal surfaces.

DOMINANT

When a product displays the arresting eye-appeal that demands the attention of the casual passer-by, you can be sure that much of the credit goes to a fine finish. Such perfect coatings are no accident; they are the result of diligent study of the specific problems, combined with the technical know-how that makes desirable results a reality. Within our laboratory, a complete staff of experts is constantly at work developing individualized finishes for a wide variety of products. They will be glad to make recommendations for *your* product if you will send a sample to be finished. No obligation of course.



Research, Quality, Service

ROCKFORD VARNISH *Company*
ROCKFORD, ILLINOIS

Affiliate
GORDON BARTELS CO.
Roller Coating Specialists

Manufacturers of Protective and Decorative Coatings

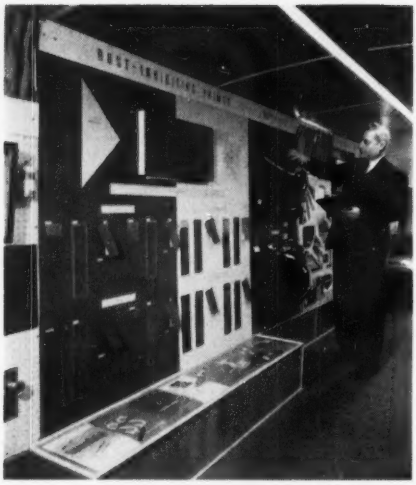


Fig. 3—New rust-resisting lacquer primers for military items are included among the panel displays in Hercules Powder Company's new "Mobile Lacquer Information Center."

as is the exterior of the car which will haul the trailer.

The "Mobile Lacquer Information Center" is scheduled to visit lacquer plants throughout the country and in Mexico and Canada. A representative from Hercules' lacquer promotion group and Hercules' Experiment Station will travel with the exhibit. They will be joined by sales office representatives in various cities.

A new technological information service has been established at **BATTELLE INSTITUTE**, 505 King Ave., Columbus 1, Ohio. The service is aimed at assisting science and industry in streamlining the costly and burdensome job of tapping existing published knowledge.

According to Battelle Director Clyde Williams, an estimated 60 million pages of technical matter is published each year, which makes finding out "what has gone before" a herculean task. "Our aim is to couple appropriate use of improved manual and machine documentation techniques with our long experience in the gathering and organization of research data."

The new service to technology will be tailored to meet individual needs. It will include the preparation of bibliographies, and coding and classification systems. Where required, the Institute will undertake development of information processing equipment.

NEW POSITIONS

GILBERT B. VALENTINE has been appointed sales manager of technical processes for Promat Division, Poor & Company, Waukegan, Illinois, manufacturer of electroplating chemicals and processes. He was formerly employed by Wagner Bros., Inc., McGean Chemical Co., and Westinghouse.

Mr. Valentine received both his Bachelors and Masters degrees in Chemical Engineering from Case Institute, Cleveland.

WILLIAM F. MOONEY has been appointed sales manager of industrial products. Formerly he was engaged by Mackley Products, selling lubricants and coolants.

Mr. Mooney received his B.S. degree in Chemical Engineerinfg from San Francisco University.

Yes: WE'D LIKE TO GET A COPY OF THE BIG NEW M & E SPRAY FINISHING EQUIPMENT GUIDEBOOK

SPRAY BOOTHS - Systems

Name_____

Title_____

Company_____

M&E MANUFACTURING COMPANY
PAINT SPRAY FINISHING SYSTEMS
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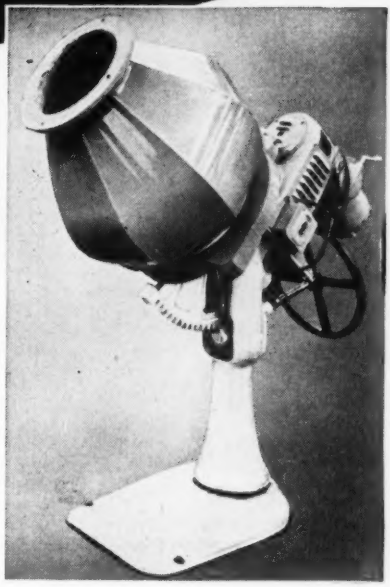
DEBURRS 400% FASTER



SAVES 40 MANHOURS PER WEEK
with

New FLASK-TYPE GLOBE *TILTING TUMBLING* BARREL

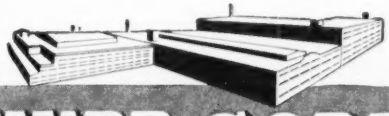
Former deburring of small precision electrical parts could be done by hand at a rate of only 40-50 pieces per hour, requiring a week for one run. One Globe Flask Type Barrel now handles the entire run of 2,500 pieces in one hour . . . a savings of 30% labor in the department. Tolerances held to .001 and .0005". These Globe Flask-Type Barrels handle steel, brass, aluminum and plastic parts with the same high output and quality finish.

Globe's new flask shell gives bigger pay-load capacity with tilting barrel control. It holds more, works faster with controlled agitation for uniform high quality parts. Low speeds for non ferrous and plastic materials.

FREE EXPERIMENTAL SERVICE

Hupp's experimental finishing laboratory will show you how to cut finishing costs. Just send samples of parts to be processed with a finished part. There's no cost or obligation.

Write Dept. F Today!



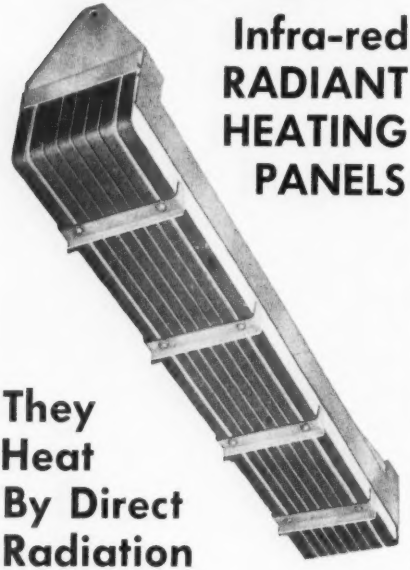
HUPP CORPORATION

GLOBE STAMPING DIVISION

1250 WEST 76th STREET • CLEVELAND 2, OHIO

SERVING INDUSTRY SINCE 1902

SYNTRON



Infra-red RADIANT HEATING PANELS

They Heat By Direct Radiation

Syntron Heating Panels cut production time and costs on any baking, heating, or drying process — because they heat by direct radiation—not by reflection. Compact, sturdy, and completely safe for use as individual panel heaters or fabricated into large ovens which require no expensive reflectors or other attachments.

Thin, strip type element design insures a flat, uniform, continuous heating pattern.

Write today for free Catalogue

SYNTRON COMPANY
452 Lexington Ave. Homer City, Pa.

L. V. Nagle, vice-president and general sales manager of Udylite Corporation has announced the appointments of **LOUIS J. MINBIOLE** as assistant sales manager, and **FRANK REHA** as sales engineer in the Michigan territory.

Mr. Minbiole joined Udylite in 1946 as a sales engineer in the Michigan territory. A 1940 graduate of Wayne University

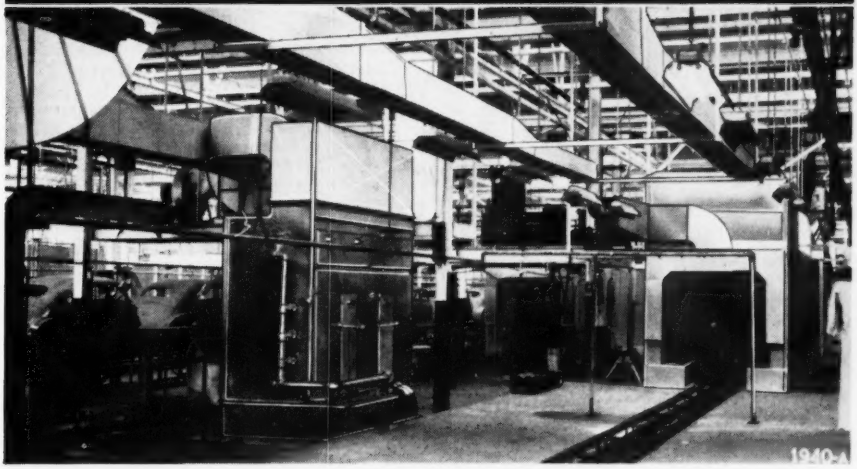
Frank Reha (left), Louis J. Minbiole

College of Engineering, he was awarded a Master's degree in Chemical Engineering from Massachusetts Institute of Technology in 1941. Prior to joining Udylite, he was associated with Buick Division of General Motors Corporation.

Graduated with a degree in Chemical Engineering from Lawrence Institute of Technology, Mr. Reha joined Udylite as a chemist in 1939. He first served as field service engineer in the Michigan territory, and later joined the Indianapolis Udylite sales office as sales and service engineer. He has been active in the metal finishing field for the past seventeen years.

HARRY M. ANDERSON, JR., has been appointed assistant to the president, in charge of Surface Chemicals, Inc., division of The McKay Company. In his new position, Mr. Anderson will direct the research, manufacturing and sales program for specialty finishing products and chemical resistant finishes. He will make his headquarters at the company's laboratories and plant in McKees Rocks, Pa. Prior to his present appointment, he was with the Chemical Division of the General Electric Corporation.

HOW KOCH ENGINEERING ASSURES A MORE EFFICIENT FINISHING SYSTEM:



KOCH engineers appraise your finishing problem considering (1) process needed, (2) exact sequence of operations, (3) building layout, (4) best method of handling to tie in with other operations, and (5) production schedules.

Your system is then engineered to fit your specific requirements, built with a background of over 80 years of metalworking experience, and installed so that every component dovetails perfectly. No last minute changes, no costly extra work.

KOCH'S single responsibility for the entire job results in peak operating efficiency, increased production at lower unit cost. *Request a KOCH engineer now for consultation without obligation!*

* * *

KOCH also builds baking ovens, spray booths, metal washing equipment and air makeup systems. Write for Folder K-10.

PHONE, WIRE OR WRITE TODAY!

GEORGE KOCH SONS, INC.

EVANSVILLE, INDIANA

William C. Davidson

WILLIAM C. DAVIDSON has been appointed abrasive engineer for the West Virginia territory, according to an announcement by Ralph M. Johnson, vice president in charge of sales at Norton Company.

Mr. Davidson was formerly instructor of human relations in Norton's sales training department. More recently he has been a grinding engineer in the precision grinding section of the company's sales engineering department.

With Norton Company since 1945, he was at one time associated with the Frigidaire Division of General Motors Corp. at Dayton, Ohio, in the tool engineering and educational departments. Mr. Davidson is a registered professional engineer in the State of Ohio and a graduate of Ohio State Unversity.

ALBERT H. CLEM has been appointed general sales manager of the Pennsylvania Salt Manufacturing Co., filling the position left vacant by the recent death of Russel S. Roeller, it has been announced by William P. Drake, vice president.

Before this appointment, Mr. Clem was assistant general sales manager. He joined Pennsalt in 1938 following his graduation from the Pennsylvania State College with the degree of Bachelor of Science in Chemical Engineering.

Starting in the Development Department of the Research and Development Division, he was subsequently a technical sales representative in the Detroit area for the Metal Processing Department; and then, in the same department in Philadelphia, a product supervisor, assistant sales manager, and sales manager.

He then became assistant to the vice president in charge of sales; sales manager of the Industrial Chemicals Department, and field sales manager in charge of all district sales offices.

The American Buff Company, Chicago, has announced the election of **STANLEY P. SAX** as vice-president. Mr. Sax was

Solventol

RESEARCH ORIGINATED *

DI-PHASE

METAL CLEANING

Solventol Di-phase metal cleaning processes and compositions are so fundamentally different they have been patented.

Information on these basically new metal cleaning advancements is available upon request. *Write to:*

SOLVENTOL CHEMICAL PRODUCTS, INC. • DETROIT 3, MICHIGAN

* Di-phase metal cleaning concentrates, baths and processes are covered by U. S. Patents Nos. 2,399,205; 2,399,267 and 2,583,165. Unrestricted licenses under these patents will be granted on request at established royalties.

DESIGNERS & BUILDERS OF SPECIALIZED

METAL CLEANING EQUIPMENT

READ HOW PELRON SOLVED FOUR DIFFERENT PAINT STRIPPING PROBLEMS!

1 PROBLEM: Stripping of tough Epon base enamel from washing machine parts.

SOLUTION: Although Epon base enamels were virtually impossible to strip, Pelron developed its Unisol 503 especially for this purpose. It is a cold paint stripper which now strips rejected parts quickly and economically.*

2 PROBLEM: Stripping glyptal type varnish from transformers and fluorescent light ballasts.

SOLUTION: Pelron completed a thorough study of the problem and designed a stripper which removed the varnish and allowed for easy, economical revarnishing of the coils immediately after stripping.*

3 PROBLEM: Difficulty in stripping enamel from automotive steering wheels without damaging hard rubber base.

SOLUTION: Any injury to the base of the wheels made it impossible to repaint them. Thus Pelron found that the same stripper developed for problem No. 2 did the work quickly and economically.*

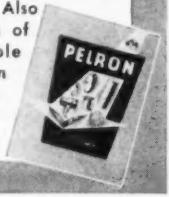
4 PROBLEM: Stripping protective lacquer from automobile bumpers.

SOLUTION: Automobile bumpers, due to metal restrictions, have been coated with a protective lacquer which was hard to strip in case of rejects. Pelron research found a product to cut the lacquer easily and made stripping a routine operation.*

*Complete details will be furnished on request.

NEW!
FINISHING BULLETIN

Send for your free copy of Pelron's new bulletin for the finishing industry. It contains all pertinent data on Pelron cleaners, phosphating compounds, paint booth compounds, and paint strippers. Also complete descriptions of interesting, profitable applications of Pelron products to specific jobs. Get your copy today.



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Industrial Oils and Chemicals for Better Production at Lower Cost

head of sales in the Midwest area, with headquarters in Detroit. He has been affiliated with the American Buff Company since October, 1948.

ROMAN C. BENDER has been appointed representative for The Clinton Company covering the Indiana territory. He was formerly with the Egyptian Lacquer Co. and the George A. Stutz Co., manufacturers of plating supplies. He will make his headquarters at his home address, 1220 Leland Ave., Indianapolis.

Morris J. Messing, president of Bart-Messing Corporation, Belleville, New Jersey, has announced the appointment of **EDUARDO R. REDLHAMMER** as vice president in charge of the Sel-Rex Rectifier Division, and **SID MITWOL** as sales manager of the same division.

Mr. Redlhammer has been associated with Bart-Messing since 1947. He was formerly chief engineer in charge of rectifier development. Prior to joining Bart-Messing he studied electrical engineering at Penn State, and pioneered many new developments in the rectifier industry.

Eduardo R. Redlhammer (left), Sid Mitwol

As sales manager of the Sel-Rex Rectifier Division, Mr. Mitwol will direct the activities of an expanded sales organization for the division. Mr. Mitwol joined Bart-Messing four years ago. He received his B.S. degree in electrical engineering at C.C.N.Y., and was formerly associated with Federal Telephone and Radio Corp., and Radio Receptor Corporation.

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Performance - Proved
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FINISHES
Lacquers • Enamels • Dopes • Thinners
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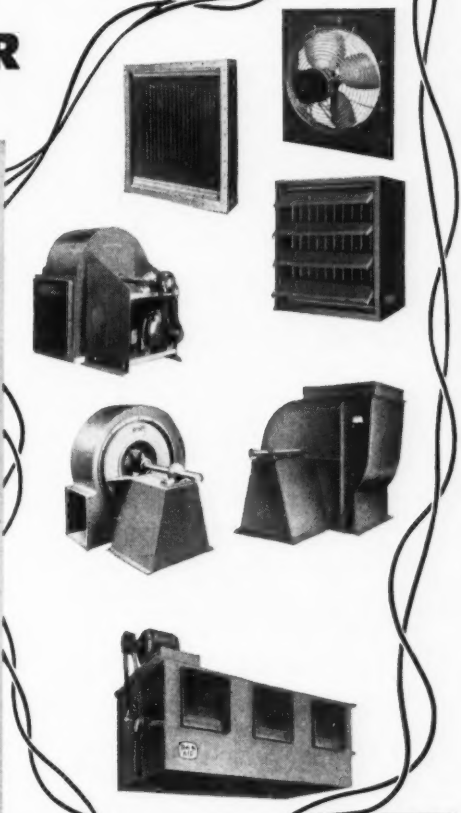
It has been announced that **WALTER M. BARDEN, JR.** has joined the industrial finishes division of Standard-Toch Chemicals, Inc. as sales and technical service representative for Ohio and Western Pennsylvania. He recently completed a comprehensive technical training course in the company's laboratories at Chicago, and is well qualified to offer assistance on finishing problems to manufacturers of metal, wood and plastic products.

J. BOISEAU WIESEL, assistant to the general manager of Hercules Powder Company's cellulose products department, has retired upon completion of 37 years with the company, it has been announced.

Mr. Wiesel has played a leading role in promoting the widespread acceptance and use of lacquer. He has been an active participant in the National Paint, Varnish and Lacquer Association for many years and was the founder of the present Lacquer Committee of this association.

nyb

PROPELLER FANS



Propeller type ventilating fans deliver large volumes of air at low resistance and low current consumption. All wheels are machine balanced for smooth, vibrationless operation. Made in 2 types and 7 basic sizes to cover a wide range of industrial applications. Pressed steel panels provide rigid support and simplify installation. Totally enclosed motors mounted in heavy welded wire safety guard. Wheel diameters from 12 inch to 48 inch. Direct or belted drive. Capacities from 675 cfm to 23,500 cfm.

Penthouses for roof installation of ***nyb*** Propeller Fans can be furnished in 7 sizes. Louvers open and close automatically to protect fan against the weather. Separate louvers for wall mounting also available.

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THE NEW YORK BLOWER COMPANY

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FACTORY, LAPORTE, INDIANA

HARRY E. BEANE has been appointed vice president of sales of The Bristol Company, Waterbury, Conn., manufacturer of automatic controlling, recording, telemetering, and aircraft instruments, and socket screw products, according to an announcement by William H. Faeth, president of the company.

Mr. Beane joined the Bristol sales engineering organization in 1920 and in 1925 was appointed district manager of the Birmingham, Ala., office. In 1930 he became district manager of the Pittsburgh district. In 1943 he was made sales manager of the Instrument Division of the Company and in 1947 promoted to the position of general sales manager.

LOU R. GALLAS has been appointed sales engineer for electropolishing processes and installations by Electro-Glo Company, Chicago chemical manufacturer.

Mr. Gallas is a member of the American Electroplaters' Society and has been active in metal finishing industry affairs since 1941. He was formerly associated with Promat Division of Poor & Company, and Tincher Products Company, Division of Ideal Industries.

His headquarters for the distribution of electropolishing concentrates will be located in Chicago.

August B. Hoefer

Election of **AUGUST B. HOEFER** as vice-president of Udylite Corporation and vice-president and general manager of Frederic B. Stevens, Inc., has been announced by L. K. Lindahl, president of Udylite Corporation.

Frederic B. Stevens is a wholly-owned subsidiary of Udylite. Mr. Hoefer joined the Udylite Corporation in November, 1928, after graduation from Purdue University with a degree in Chemical Engineering. He went to the New York branch of Udylite in October, 1929, as a sales engineer. He became New York district manager in 1939.

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Corrosion-Resistant Polyethylene-Lined Drums

Better — Yet Cost Less!

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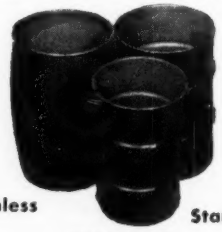

Seamless Standard

PRICE LIST

Gallon Cap.	Inside Diam.	Inside Height	List Cost
	STANDARD		
3½	11″	9″	$ 7.50
5	11″	12″	9.50
15	15″	20″	17.50
20	18″	20″	24.50
30	18″	27″	29.50
55	22″	34″	36.50
	SEAMLESS		
30	18″	27″	40.00
50	22″	34″	52.00

Covers $4.00 extra

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FERRO-CO CORPORATION

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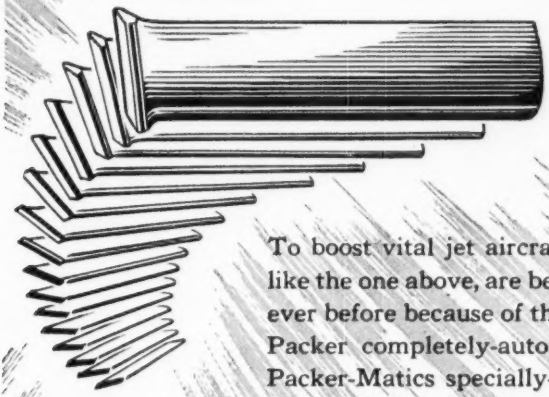
Long Island City 1, N. Y.

Jet blade production increased



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To boost vital jet aircraft production jet blades like the one above, are being produced faster than ever before because of the speed and efficiency of Packer completely-automatic buffing machines. Packer-Matics specially-designed to do this one job are finishing at a high rate of production, to exacting specifications, without a single finishing reject. Packer machines are also hard at work buffing, grinding, or de-burring reciprocating engine parts for planes, tanks, and vehicles, casings for shells, and many more items essential to defense. If higher finishing room production can help you, whatever you make, write today for more information about the versatility of continuous, indexing, or straight-line Packer-Matics: the Packer Machine Company, 400 Center St., Meriden, Conn.

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THE PACKER MACHINE COMPANY • MERIDEN, CONN.

R. W. Murray, president of Hooker Electrochemical Company, has announced the election of **R. WOLCOTT HOOKER,** former vice president in charge of sales, as vice president. Mr. Hooker has been given broader responsibility with respect to overall management of the company. Among his other duties, he will continue to be active in sales work.

Mr. Hooker joined Hooker Electrochemical in 1922 and became assistant to the sales manager in 1929, assistant sales manager in 1930 and sales manager five years later. He was elected a director of the company in 1937 and vice president and sales manager in 1941. In 1949, he was appointed vice president in charge of sales.

ROBERT E. WILKIN, former general sales manager, has been elected vice president and general sales manager. **FRANK W. DENNIS,** former director of industrial relations has been elected vice president in charge of industrial relations.

Mr. Wilkin became associated with Hooker in 1936 as sales manager of fine chemicals. He was named Eastern sales manager in 1943 and general sales manager in 1949.

Mr. Dennis began his career with Hooker in 1916 as assistant time-keeper, returned in 1919 after serving in the United States Army in World War I and became personnel director and employment manager in 1927. In 1950, he was named director of industrial relations for all Hooker plants at Niagara Falls, N. Y., Tacoma, Washington, and the Hooker-Detrex plant at Ashtabula, Ohio.

For Platers, Silversmiths, Jewelry Mfgrs., Makers of Watches, Clocks and Electronics and other metal finishers.

Supplied in straight or crimped brass, steel, nickel silver or stainless steel wire in sizes .0025 to .006 and in bristle, fibre or Nylon. Special sizes and shapes to order.

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MEETINGS

THE FOURTEENTH ANNUAL NEW ENGLAND REGIONAL MEETING of the **AMERICAN ELECTROPLATERS' SOCIETY** will be held Saturday, May 9, at the Hotel Kimball, Springfield, Massachusetts. A.E.S. Branches participating in this meeting are the Springfield, Hartford, New Haven, and Waterbury branches.

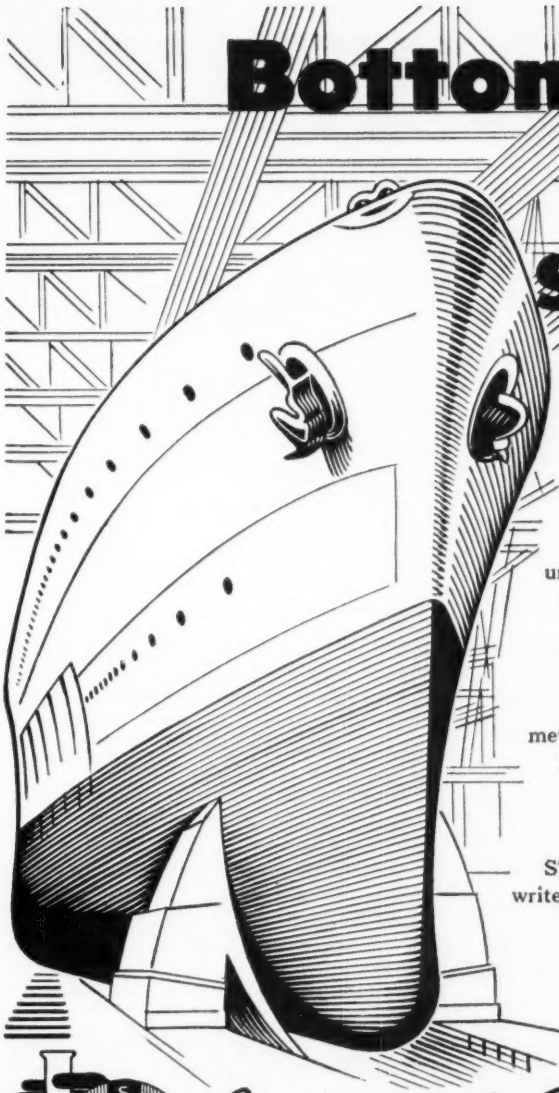
The Technical Session beginning at 1:45 P.M. in the Main Ball Room of the Hotel Kimball will be preceded by a movie entitled, "Dare Devils on Ice and Water Sports." Dr. Joseph V. Petrocelli of the Patent Button Company will then present a paper on "The Polarographic Analysis of Nickel Plating Solutions."

Dr. Harry Walker, vice president of the Richardson-Allen Corporation will present a paper on the "Application of Power in the Plating Room." The third paper on the program will be presented by Franklyn J. MacStoker of the Farrand Optical Co., Inc., President of the A.E.S. Mr. MacStoker's subject is "Metal Coloring, Galvano-Bas Relief and Antiques.'

The banquet and entertainment program will begin at 6:30 P.M. in the Main Ball Room. The Entertainment Committee has arranged a complete program for the ladies beginning at 1:00 P.M., with registration in the Main Lobby of the hotel. A social hour in the Main Dining Room is scheduled, and at 3:00 P.M. a talk on "The Romance of Gems" will be presented by Orlando S. Paddock, manager of the diamond department of Tilden-Thurber, Providence, R. I. To illustrate this talk he will show a dazzling display of gems.

Complete information regarding the program may be obtained from the Chairman, E. F. Koetsch, Jr., 120 Oakwood Dr., Longmeadow, Mass., or from members of the cooperating branches.

Bottoms up! for Stantite



STANTITE Spraying Primer has passed the tough test of a ship's bottom with colors flying. That's why many ship owners are undercoating with STANTITE to minimize corrosion and rust creep. And on land, wherever metal is coated, rust-inhibiting STANTITE also provides excellent adhesion to any metal surface, with most top coats. Ideal under air-dried or baked finishes, it dries rapidly . . . is unimpaired by any baking schedule. Find out *now* what STANTITE can do for you . . . write today: Stanley Chemical Co., 21 Berlin St., East Berlin, Conn.

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STANLEY CHEMICAL

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Of particular interest at the **40th ANNUAL CONVENTION** of the **AMERICAN ELECTROPLATERS' SOCIETY**, to be held in Philadelphia from June 15 through 18, will be the Branch Exhibits of electroplated ware. This display will be held in the Betsy Ross room of the Benjamin Franklin Hotel, convention headquarters. To qualify for presentation, each exhibit should be of an educational nature. No finished article may be described or displayed without indicating prior operations in the finishing of the piece. While there are no space limitations placed on displays, exhibitors are urged to keep their projects as compact as possible.

Prospective exhibitors should contact the A. E. S. Branch 2nd vice president concerned for details regarding exhibits. The American Electroplaters' Society has arranged for storage and insurance of all exhibits during the time of the Convention and while the exhibits are on the hotel premises.

Exhibits will be accepted on or after June 11, 1953 at:

A.E.S. Convention Co-Chairmen Samuel Heiman (left) and Delmar R. Robson (right) discussing the Technical Program with Educational Chairman Frederick Fulforth.

American Electroplaters' Society,
c/o Branch Exhibits,
Benjamin Franklin Hotel,
9th and Chestnut Streets,
Philadelphia 7, Pennsylvania.

Prizes for outstanding exhibits will be awarded. They are:

Branch Exhibits:

1st Prize	$ 50.00
2nd Prize	25.00

Individual Exhibits:

1st Prize	$100.00
2nd Prize	50.00
3rd Prize	25.00

In view of the attractive prizes offered, Branch Exhibits Chairman Edwin F. Ottens anticipates that a great many exhibits will enter the competition. Chairman Ottens urges prospective exhibitors to make known to their Branch 2nd vice presidents the following information:

1. Nature of the display.
2. Estimated space requirements.
3. Additional equipment required from the Exhibits Committee.
4. Full information concerning the return of the exhibit to the owner at the close of the Convention.

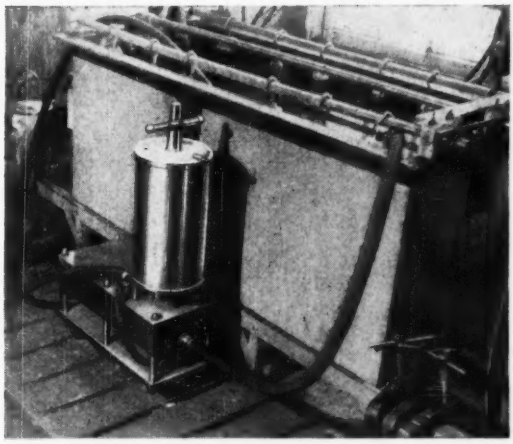
There is no entry fee or charge of any kind required of an exhibitor. The only requirement is that the exhibitor have a genuine interest in furthering the progress of electroplating and finishing.

SOCIETIES

An eminently successful **ANNUAL MEETING** of the **CINCINNATI BRANCH, A.E.S.**, was held on March 28 at the Sheraton-Gibson Hotel, Cincinnati. The meeting, for which Charles Wise of Buckeye Products Company served as general chairman, attracted about 80 persons to the educational ses-

Here's how to cut your losses

get better finished plated work — save time and labor



The *"Sealed-Disc"* Filter will remove all dirt, dust, and sludge from your plating solutions. You will no longer worry about pitting, spotting, poor adhesion, formation or nodules, etc.

More and more platers testify to the remarkable savings in operating time and labor that the *"Sealed-Disc"* Filter gives them. These cost-minded platers get better finished plated work and have found that their solutions last l o n g e r. *"Sealed-Disc"* Filters, designed to meet plating room requirements, are smaller, more compact and portable, than ordinary conventional filters.

Regardless of the size or type of your installation, there's a *"Sealed-Disc"* Filter to "fit your job". You can depend on a *"Sealed-Disc"* Filter for positive, trouble-free performance that's proof against even the invisible impurities that cause nodules and porousness, proof against losses caused by rejects and reworking. Write for complete details or contact your regular plating supplier.

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sion and over 300 persons to the dinner dance. Indicative of the interest shown in the affair is the fact that a number of out-of-town visitors attended, including delegations from Indianapolis, Chicago, Detroit, several Ohio cities, and Newark, New Jersey.

Clyde Kelly, 3rd vice president of the

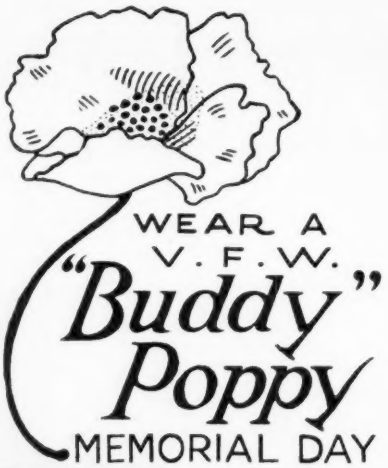

Fig. 1 (below)—This photograph shows some of the speakers and Cincinnati Branch officers, as they met for lunch prior to the Annual Meeting. They are, (left to right): Carl H. Truman, Cincinnati Branch first vice president; Carl F. Hansen, who presented a talk on "Principles of Effective Job Shop Management"; Robert D. Miller, Cincinnati Branch, president; Clyde Kelly, A.E.S. third vice president and educational session chairman; Chas. Wise, general chairman of the Annual Meeting.

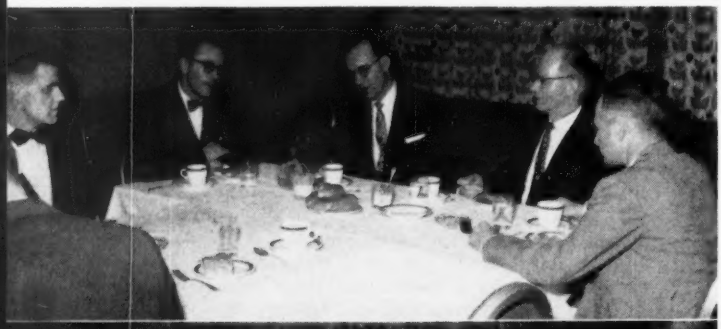

Fig. 2 (left, center)—Another view of the speakers' luncheon. Shown in the photo, (left to right), are Hudson Biery, who spoke on the subject, "Why We Must Treat Our Waste Now"; Charles T. Nuzum, Cincinnati Branch treasurer; William D. Gordon, Cincinnati Branch second vice president; Mr. Truman, Mr. Hansen, Mr. Miller, Mr. Kelly, Mr. Wise; H. S. Kline, who spoke on "Methods of Treating Metal Finishing Wastes"; A. M. Reed, member of Waste Treatment Panel; Raymond A. Barry, educational chairman for the Annual Meeting; J. E. Kinney, member of Waste Treatment Panel.

Fig. 3 (bottom)—Educational Chairman Ray Barry (right, standing) shown with the members of the Waste Treatment Panel at the conclusion of the educational session. *(PRODUCTS FINISHING Staff Photos)*

the jet-black metal finish that's done with one bath!

LASTS LONGER! The Houghto-Black finish is tough—long-lived—yet so thin it won't alter dimensions of close-tolerance parts!

PROTECTS BETTER! Houghto-Black colors metals uniformly—even steels of different analyses finished at different times! Gives them a handsome jet-black finish.

COSTS FAR LESS! Houghto-Black is a simple one-bath treatment. Inexpensive tanks and controls are used for dipping parts. And it's applied to mass production with a minimum of costly equipment! Write for folder.

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Ready to give you on-the-job service . . .

American Electroplaters' Society, served as chairman of the educational session.

HONORS

JOSEPH B. TATE of the Witt Cornice Company, Cincinnati, Ohio, and **FREDERICK C. BRIGHTLY, JR.**, of the Brightly Galvanized Products Company, Cicero, Illinois, were presented the Thomas M. Gregory Memorial Award for the years 1951 and 1952 respectively at the American Hot Dip Galvanizers Association banquet as part of the 1953 Annual Meeting.

D. M. Hayes of the Wilcox Crittenden Company, Middletown, Conn., retiring president of the association, awarded the certificates and engraved wrist watches to Mr. Tate and Mr. Brightly on behalf of the association board of directors.

The award was originated in 1940 in memory of Thomas M. Gregory, and is only presented when the board of directors feel outstanding contributions have been made to the industry. Only two others have received the award since its creation eleven years ago.

F. C. Brightly, Jr. (left), J. B. Tate

meetings OF INTEREST TO FINISHERS

May 9. A.E.S. Fourteenth New England Regional Meeting, Kimball Hotel, Springfield, Mass.

May 9. 35th Annual Banquet, Masters' Electro-Plating Association, Inc. Waldorf Astoria Hotel, New York, N. Y.

May 18-20. First Federal Convention, Australian Electroplating Industry, under the auspices of the **Melbourne Branch, A.E.S.,** Hotel Federal, Melbourne, Australia.

May 27-29. Seventh Annual Convention, American Society for Quality Control, Convention Hall, Philadelphia, Pennsylvania.

Jun. 1-3. 21st Annual Stove Convention and Exhibit, Institute of Cooking and Heating Appliance Manufacturers, Netherland Plaza Hotel, Cincinnati, Ohio.

Jun. 15-18. American Electroplaters' Society, 40th Annual Convention, Benjamin Franklin Hotel, Philadelphia, Pa.

June 29-July 3. ASTM Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 16-18. 15th Annual Shop Practice Forum, Porcelain Enamel Institute, Ohio State Univ. and Deshler-Wallick Hotel, Columbus, Ohio.

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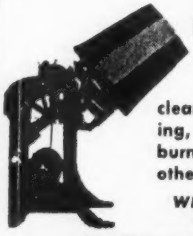

Motor Driven Tilting Tumbling Barrels for cleaning, polishing, grinding, deburring, sanding, burnishing and various other applications.

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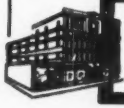

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PEEL SPRAY-BOOTHS CLEAN WITH LIQUID ENVELOPE

Good men are hard to get today. Why waste their time and your money—on the "jack-ass labor" job of scraping down spray-booths? Keep your booths clean, firesafe, better illuminated, better ventilated by using "LIQUID ENVELOPE".

Simply spray on with your regular spray-equipment. When overspray accumulates, break film and peel off in great big sheets. Takes only a few minutes for a 12 x 12 booth. Actually costs less than the hand-labor way. Order a 5-gallon Test Sample (Drum Lot Price on test-sample order!)

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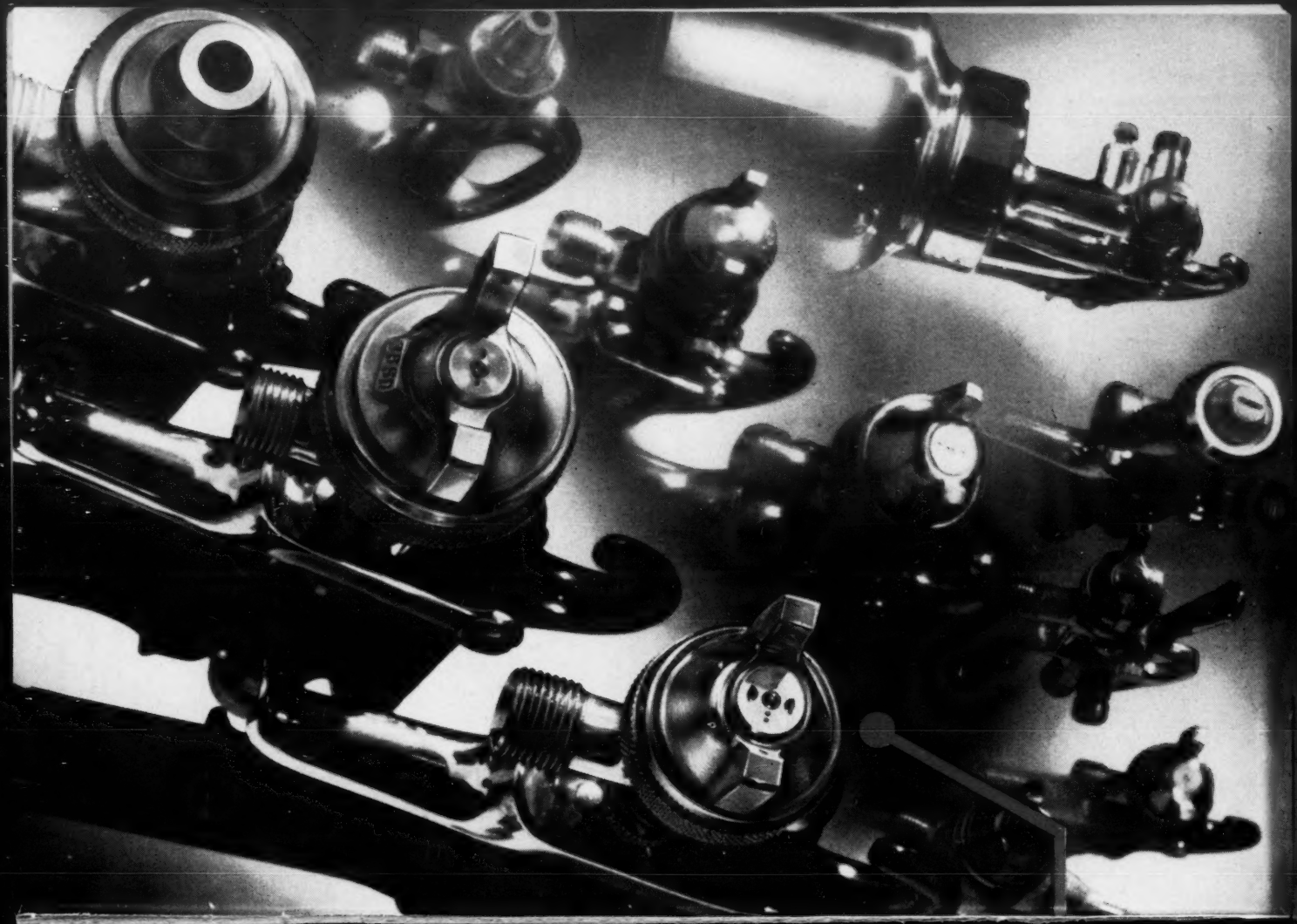

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And this is only a beginning. With 36 gun models and 1050 nozzle combinations currently available, Binks equipment is applying materials varying from those fluid as water to those thick as tar. So, whatever the finish or coating, Binks can tell you if spraying is possible...and what equipment to use. Send in coupon, or write: Binks Manufacturing Company, 3118-40 Carroll Ave., Chicago 12, Illinois.

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New • EQUIPMENT • MATERIALS • PROCESSES

Dulite 3-0 Black

A ferrous metal blackening compound known as Dulite 3-0 Black, has been introduced by the Du-Lite Chemical Corp., Middletown, Conn.

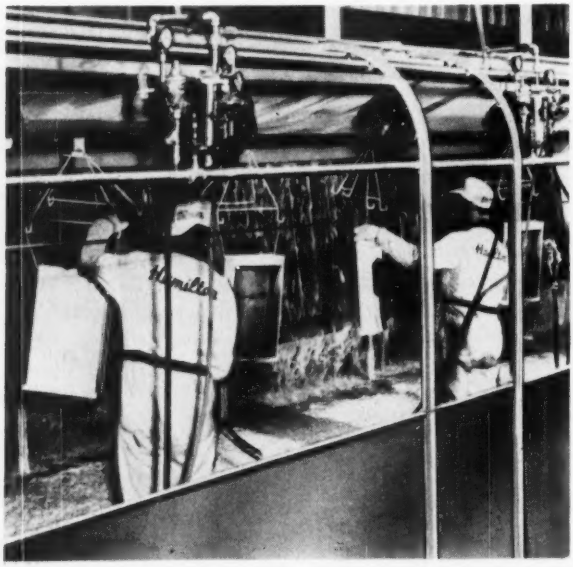
Claimed to be particularly effective for stainless steels, this compound will produce a non-fading black finish quickly and easily on malleable iron, too, without the need for special equipment.

The operating temperatures required for processing with Dulite 3-0 are low, the maximum involved being 240 deg. F. The compound is supplied in dry salts form which may be mixed as needed, eliminating the inconvenience and danger of carboys and liquid chemicals.

Klem Water Wash Compound No. 203

Klem Chemicals, Inc., 14401 Lanson Avenue, Dearborn, Michigan, has announced a line of water wash compounds said to make the reclaiming of paint from spray booths more practical and economical.

Featured in this line is Klem Water Wash Compound No. 203, compounded to eliminate nightly draining of tanks. The manufacturer states that tests show that No. 203 may be used up to seven days before draining is required. Circulation lines, water pumps, flow control nozzles and baffles were reported free of



Klem Water Wash Compound No. 203 assists in the operation of spray booths, such as the one here illustrated.
(Photo courtesy R. C. Mahon Company, Detroit 34, Mich.)

paint sludge at the end of this period in production tests.

The principle embodied in No. 203 is the lowering of the surface tension of the water, assuring complete and more uniform coverage on the water curtain, and keeping the paint in a form that may be easily reclaimed.

Dynaprecipitor Spray Booth

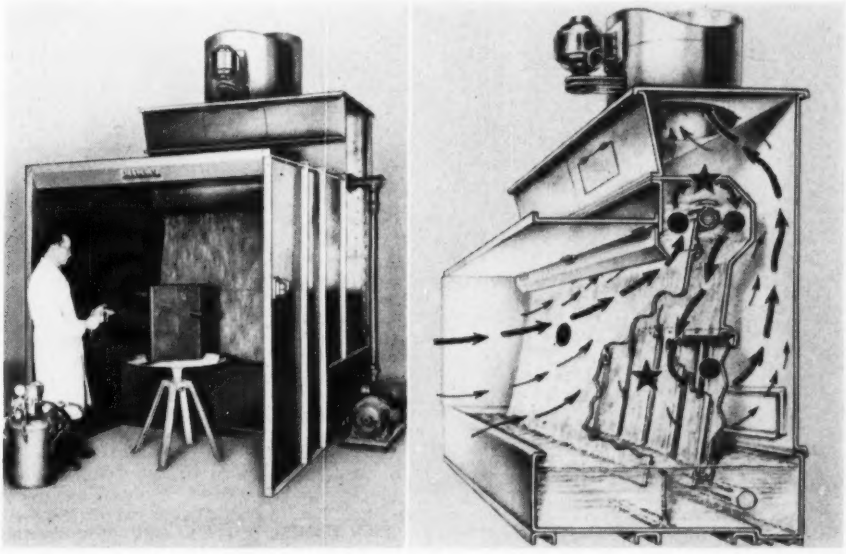
A Dynaprecipitor water wash spray painting booth, featuring a combination of water washing and centrifugal force, has been announced by the Binks Manufacturing Co., 3118-40 W. Carroll Ave., Chicago 12, Illinois.

Overspray and fumes are drawn through the booth by a powerful exhaust fan. Thorough water washing, or scrubbing, takes place at four locations. The paint particles are flushed into a collection pan for easy reclamation or removal.

In addition to scrubbing the air as it passes through the washer, the water system constantly flushes surfaces of the washer where paint strikes. This is reported to greatly reduce down time for booth cleaning. The impingement action takes place at two major locations. At these points, air flowing through the booth makes abrupt changes in direction. The resulting centrifugal force flings paint particles out of the air onto the walls, curtains or baffles of the booth.

The Dynaprecipitor Spray Booth introduces a new design feature—self-scouring baffle plates. Located at the base of the rear water curtain, their purpose is twofold: to trap any pigment that may have escaped prior washing or air whirling, and to remove any free moisture in the exhaust air.

All surfaces of the booth can be easily reached, according to the manufacturer. The reflector plate just ahead of the major curtain is hinged to swing back, providing easy access to the centrifugal chamber at the top of the booth. The front water curtain and the self-scouring baffle plates can be lifted out by hand. A recessed trough in the collection pan of the washer is claimed to ensure complete drainage of the water pan, thus speeding draining and simplifying cleaning operations.



Typical installation of Dynaprecipitor Spray Booth (left). In the diagram at right, at points marked with a dot, exhaust air containing entrained paint particles passes through a water curtain. At points marked with a star, a sudden change in direction of flow, and resulting centrifugal force, separates paint particles from the air stream.

Standard units vary in size from 4 ft. up to 20 ft. in width, from 7 to 10 ft. in height. Special sizes are available.

Soniclean Process

The Detrex Corporation of Detroit, Mich., manufacturer of industrial cleaning equipment and chemicals, has announced the development of an advanced, practical method of metal cleaning through the use of ultrasonic waves.

The new method, known as the Detrex Soniclean Process, features a man-made element for directing sound energy—a development which Detrex technicians say opens the door to far-reaching advances in a wide variety of industrial fields.

"Use of the new transducer element takes ultrasonic cleaning out of the laboratory 'dream' stage and makes it a production reality," W. F. Newbery, director of sales for Detrex, said in announcing the new process. "By employing this new element in place of the quartz crystals previously used in ultrasonic experiments, we have overcome the limitations caused by the size and properties of quartz."

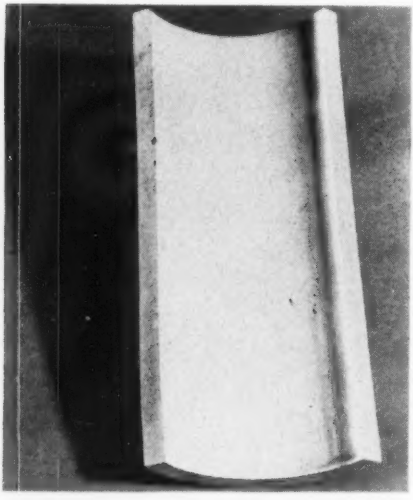


Fig. 1—The man-made, ceramic transducer—heart of the new ultrasonic cleaning process developed by the Detrex Corporation of Detroit—is shown above. Its size, focal properties and flexibility are considered far superior to natural quartz crystals used in previous ultrasonic cleaning processes.

Fig. 2—Extreme agitation in the liquid shown here is caused by ultrasonic waves projected from a ceramic element, known as a transducer. Outline of the transducer can be seen a few inches below the surface.

Mr. Newbery pointed out that the use of ultrasonics for cleaning is not a new or revolutionary idea, adding that Detrex laboratory technicians have been conducting such experiments for years, and more recently have concentrated their efforts in the search for a transducer far more flexible than natural quartz.

The element, jointly engineered by Detrex and the Brush Electronic Company, is a curved piece of ceramic resembling a six-inch-long pipe, cut in half along the longitudinal axis (see Fig. 1). The ceramic pieces, which can be connected in series and arranged as desired, are designed to offer focusing and flexibility properties never before found in equipment of this type, Mr. Newberry said.

In the Detrex Soniclean Process, electrical energy is transmitted to the ceramic transducer, converted into sound energy, and projected through a solvent at a frequency of 430,000 cycles per second (see Fig. 2). The solvent currently being used in the Soniclean Process by Detrex is trichlorethylene; however, the process is not limited entirely to this material. Because a potential of only 40 volts is required to operate the ceramic

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transducers, they can be safely immersed directly in the solvent. This is said to eliminate the complicated sealed containers that are required with other transducer materials and high voltages.

Material to be cleaned is placed in the solvent, either manually or by conveyor, directly in the path of greatest focal intensity of the ultrasonic waves. In this area an extreme turbulence is created, resulting in a deep and penetrating cleaning action that removes, almost instantaneously, all dirt, grease, chips and microscopic particles of soil from even the most intricately designed and close-fitting parts (see Figs. 3 and 4).

Because of the design of the ceramic transducer, the sound waves converge to a straight line as long as the transducer itself.

The high frequency Hypersonic generator used in the Soniclean Process is completely protected by numerous safety and overload devices and provides easily adjustable tuning drawers that offer absolute frequency control, the Detrex official said. The unit operates on low voltage current.

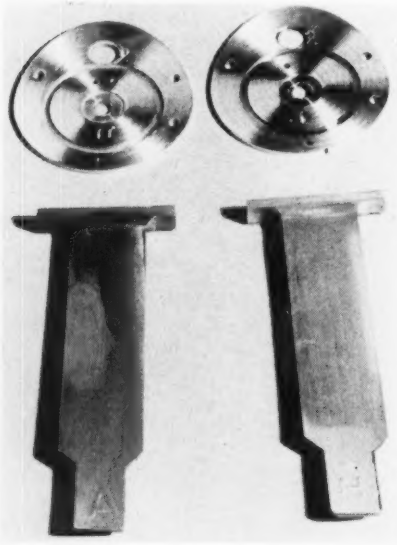


Fig. 3—Metal parts before and after degreasing by ultrasonic waves are shown above. At the top are brass end plates for fishing reels. The one at the left has a film of hard-to-remove brass dust on its surface and in its crevices. Ultrasonic energy cleaned the part almost instantaneously. Iron oxide paste on a jet engine blade (left) also was removed completely and rapidly by the new process.

Fig. 4—Foreign matter adhering to the surface of a jet engine blade is shown here as it is almost literally "exploded" away by ultrasonic waves. In this case, the substance is an iron oxide paste which is used to coat the blades to help detect possible flaws, and which is extremely difficult to remove by ordinary methods.

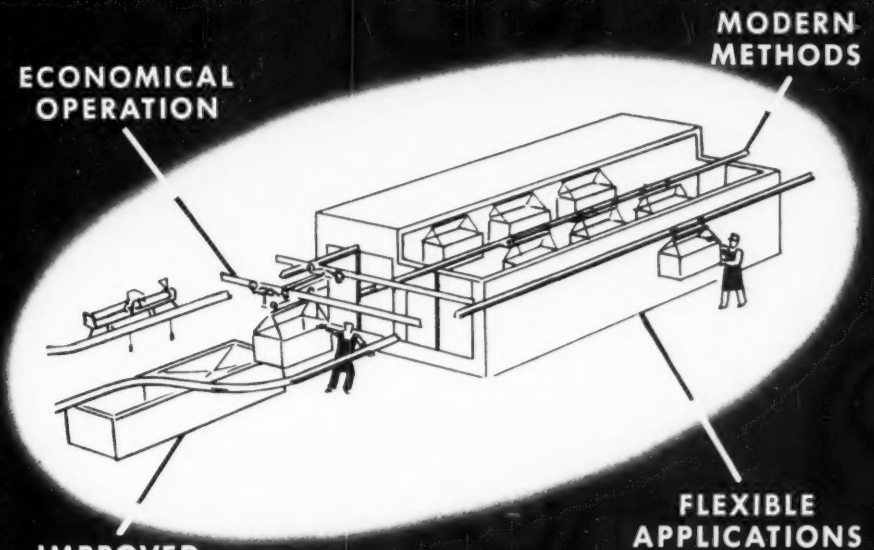
Black Magic S.S.

The Mitchell-Bradford Chemical Co., 2446R Main St., Stratford, Conn., has announced manufacture of Black Magic S. S., a process for blackening stainless steels, cast and malleable irons. It is a one salt mixture, one bath process, operating at a temperature of 255 deg. to 260 deg. F.

Black Magic S. S. is stated to produce a lustrous, adherent black finish on stainless steels, cast and malleable irons, which will not chip, flake or peel. Immersion time in the blackening solution is from 5 to 15 minutes. The parts to be finished can be processed in baskets and in a few cases should be racked. A large amount of work can be processed in a relatively small volume of the solution.

WHY INDUSTRY CHOOSES

MORRISON FINISHING SYSTEMS



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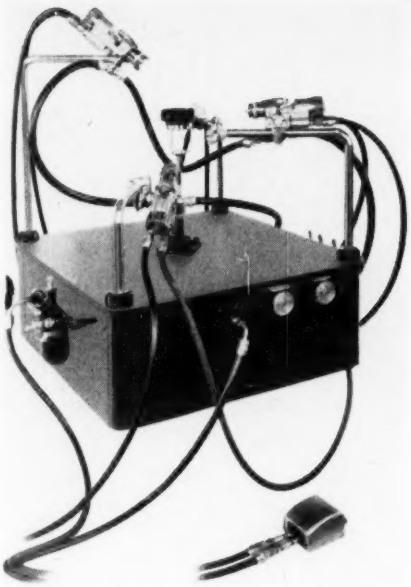
The blackening solution is made up by using 5 to 5½ pounds of Black Magic S. S. blackening salts for each gallon of solution.

Automatic Spray Painting Machine

An automatic, single-spindle painting machine which, for shorter runs, is claimed to eliminate the necessity of investing in conveyorized painting systems, has been developed by the Conforming Matrix Corporation, 356 Factories Bldg., Toledo 2, Ohio. It is being produced as a portable "package" which can be used in most standard spray exhaust booths.

One dial regulates the spindle speed from 100 to 400 r.p.m., and a second dial controls the length of time the spray guns operate. The spindle and guns are reported to go into action at the touch of a foot pedal, and stop automatically as predetermined by the dial settings.

The speed of operation is dependent upon the required loading time, which in turn is controlled by the nature of the piece being sprayed and masking devices, if employed.



Automatic Single-Spindle Painting Machine

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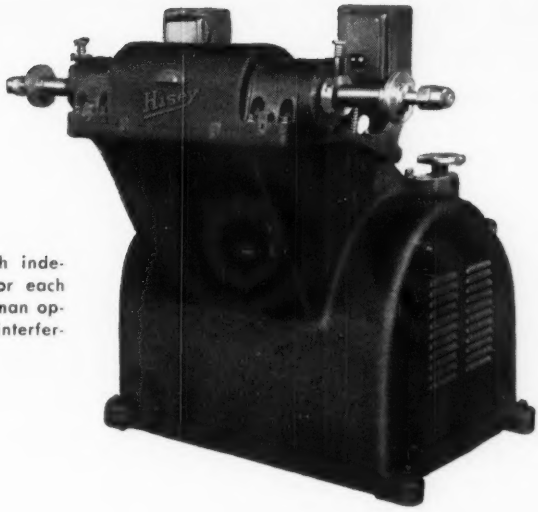
Unichrome B-165

Unichrome B-165, a clear enamel for brass, manufactured by United Chromium, Inc., 100 E. 42nd St., New York 17, N. Y., is formulated so that it can be adapted to a variety of production setups. Reduced with Unichrome Thinner 165-T, the coating can be slow-cured for 15 to 20 minutes at 325 to 350 deg. F. Unichrome B-165 is reported to have withstood 11,850 hours of 100 per cent relative humidity at 110 deg. F.

According to the manufacturer, B-165 possesses good leveling, non-blushing, and non-laminating properties. It produces a hard finish that will withstand much abrasion and wear. Remarkable resistance to many lacquer and enamel-destroying agents, such as perspiration, detergents, paint removers, and so forth, is also claimed for the product.



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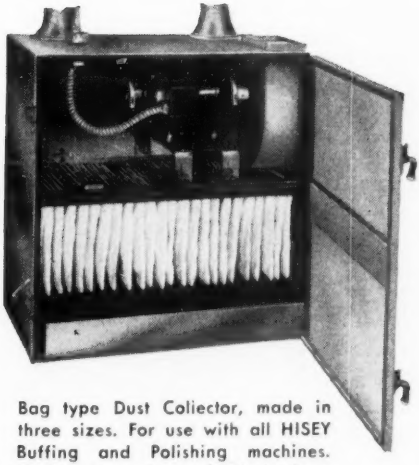

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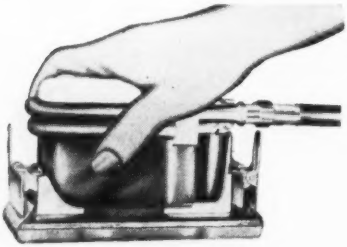
Detroit "Easy" Model J-R Finisher

Designated as the Model J-R, a small, light, reciprocating air-powered finisher, marketed under the trade name "Easy,"



Detroit "Easy" Model J-R Finisher

which is capable of producing 4,500 strokes per minute of operation on air pressures of from 50 to 60 lb. has been announced by Detroit Surfacing Machine Co., 1333 E. Eight Mile Rd., Detroit 20, Mich. The sander weighs 4 lb. and has a small palm-size grip for maximum operator comfort. The unit incorporates an air switch-type control, no-surge automatic mist-type water spray for wet sanding, and an easy-to-use abrasive holder for attaching several sheets of sand paper at one loading.

According to the manufacturer, a unique slide action design for attaching the detachable sanding pads allows for up to a 2-inch off-center adjustment of the pad. The off-center pad position is said to permit sanding in grooves, up to protruding trim, and other hard-to-get-at areas.

Metallic Rectifier

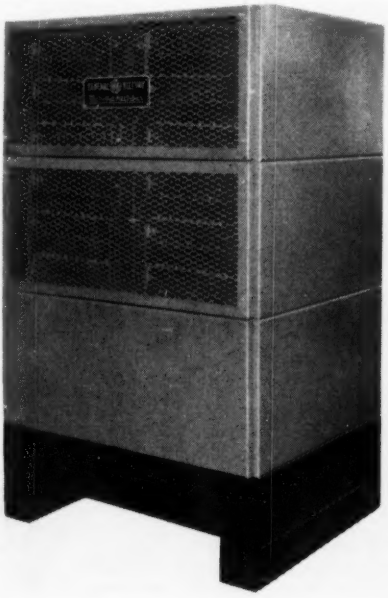
A complete line of metallic rectifier power supplies for electroplating and anodizing operations has been announced by the General Electric Company's Lighting & Rectifier Department.

Incorporating a number of advances in operating convenience and efficiency, the new equipment is characterized by the extensive use of interchangeable standardized components.

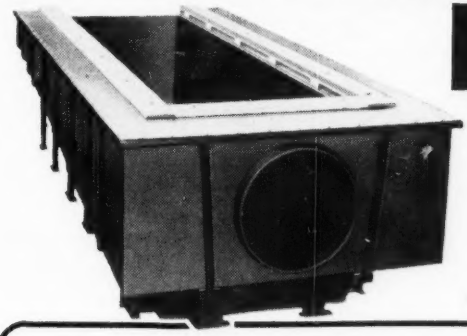
The line includes manually controlled and automotically regulated power supplies, as well as special equipment for barrel plating and precision laboratory work. Maximum operating economy in each rating is achieved, according to the manufacturer, by using a variety of circuits and either copper oxide or selenium rectifier stacks, depending on the output desired.

Direct current ratings for the new manually and automatically regulated systems range from 500 amperes at 6 volts to 2000 amperes at 48 volts. Units for barrel plating are available in ratings from 500 amperes at 6 volts to 2000 amperes at 12 volts. Laboratory platers are rated 50 amperes at 9 volts and 65 amperes at 18 volts.

Saturable reactor control is employed on manually and automatically regulated power systems. A single operator control station, for mounting beside the plating tank or adjacent to the rectifier units, controls the entire direct current output of the system regardless of the number of individual units employed. Manually controlled systems of the new line may be converted at any time to automatic regulation. This is accomplished by adding an additional section to one of the existing units to regulate voltage or current, or for anodizing control.



Metallic Rectifier



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In lower ratings, controls and rectifiers are housed in the same wall-mounted cabinet. Larger ratings are floor-mounted and employ unit construction for ease of shipment and installation. No special foundations are required.

Where especially corrosive atmospheres will be encountered, power supplies using oil immersed selenium stacks are available.

Iridite No. 15

Allied Research Products, Inc., 4004-06 E. Monument St., Baltimore 5, Md., has announced the addition of Iridite No. 15 (Mag-Coat), a protective finish for magnesium, to its line of Iridite protective finishes for zinc, cadmium, aluminum and cuprous alloys.

Like all Iridite finishes, Iridite No. 15 for magnesium is a chromate conversion coating. Dark brown in color, it is described as being of a complex chromium-chromate nature. The film is stated to be highly resistant to atmospheric corrosion, as well as to corrosion from some chemical sources. The film is an integral part of the metal itself, rather than superimposed. A slight dimensional change is caused by treatment with Iridite No 15, depending upon time of immersion.

Iridite No. 15 can be applied to wrought, cast or extruded magnesium, and may be used either as a final finish or a base for paint.

The film is produced by simply immersing the parts in the Iridite solution. The solution operates at ordinary room temperatures and without electric current. No special equipment is required. A slight amount of fuming, product of the reaction that produces the Iridite surface finish, will be noticed when magnesium parts are immersed in Iridite No. 15.

According to the manufacturer, immersion times vary from as few as 15 seconds to only 2 minutes, depending upon the condition of the metal prior to treatment, alloy treated, and dimensional stability required.

The application method is said to be simpler and the total processing time shorter.

PRODUCT LITERATURE

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Electroforming Difficult Shapes. A 4-page, illustrated leaflet available from International Nickel, Dept. EZ, 67 Wall St., New York 5, N. Y., details 12 applications that suggest other possibilities in joining, eliminating costly machining,

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making complex accurate shapes, forming dies, bonding abrasives, reproducing detail and making continuous fine mesh screens. Physical properties, plating solutions and operating conditions are given for copper, iron, soft, medium and hard nickel deposits.

Service Guide 2.1. The National Safety Council's new **Occupational Safety Service Guide** provides company safety directors with a complete catalog of the many and varied accident prevention aids available from the Council.

In the service guide, company safety men will find not only the tools they need to build their plant safety programs, but also the training aids available for instructing supervisors and workers.

For the safety man, the 52-page guide offers the Council's periodicals, newsletters, and a complete library of technical and administrative publications covering all phases of occupational accident prevention. Information on the subjects covered in the basic and advanced courses of the Council's Safety Training Institute also is included.

To assist the foreman, the service guide offers a monthly magazine, 24 training films that show supervisors how to use basic human traits in building a better safety program, and several hundred made-to-order five-minute safety talks.

A full line of posters, films and booklets are available to sell safety to the man on the job.

Copies of Service Guide 2.1 can be obtained without cost by writing the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

"Cathode Potential, Efficiency and Throwing Power of Nickel Plating Solutions" is the title of a 12-page booklet issued by International Nickel Co., Inc., Dept. EZ, New York 5, N. Y., which presents technical data on properties affecting throwing power for nickel chloride, hard nickel, and Watts' plating solutions.

On any metal finishing problem

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Cathode potential, cathode efficiency, resistivity and metal distribution ratios for the several baths are given and behaviors are compared. Eight tables and charts are included.

Good News About Electrocleaning Zinc-Base Die Castings is the title of a folder currently available from Oakite Products, Inc., 120 Rector St., New York 6, N. Y., manufacturer of industrial cleaning and allied materials. The folder describes how a new anodic conditioner, Oakite Composition No. 95, effectively removes the films and overcomes the obstacles that most commonly interfere with successful electroplating on die-cast zinc.

Among the advantages offered by this material, the folder states, are the following: brighter plating, no anodic blackening, and fewer rejects. The folder reports that plating applied to sound surfaces successfully withstands the severe test of baking for 60 minutes at 300 deg. F., and even in highly porous areas, heat blistering is effectively minimized by use of the conditioner.

Protective Coatings. A pamphlet being distributed by United Chromium, Inc., 100 E. 42nd St., New York 17, N. Y., describes how Ucilon Protective Coatings may be used to protect various products from corrosion. Also covered in the leaflet are methods of application and illustrative case histories. One hundred different corrosives which this coating resists are listed. Also, thirteen Ucilon protective systems are described fully.

Condensed Catalog G-18. The Burling Instrument Co., 5 Vose Ave., South Orange, New Jersey, has announced the publication of 4-page Condensed Catalog G-18. Included is a general description of all Burling electric temperature controls, pictures of all models including the new low priced Models A-1S and B-1C, and a separate description of the company's pneumatic and valve type controls.

A comprehensive selection and comparison table has been included, showing the essential features of each of the 17 electrically operated temperature controls. Included are the one, two, and three switch models some of which are suitable for 1800 deg. F. The catalog will be supplemented during the year by individual specification sheets, covering the various models in greater detail than has any previous literature.

Test Report. A colorfully illustrated sheet, showing seven steel test panels which had been subjected to various corrosive conditions and the results of different coating systems employed on each of the panels is available from the Carboline Co., 7603 Forsyth Blvd., St. Louis 5, Mo. Comparison was made on the basis of corrosion resistance, extent of peeling and edge protection.

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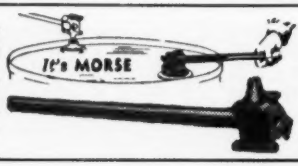

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Booklet on Rust and Tarnish Removal. A booklet on rust and tarnish removal by means of the six tailored types of Rustclean has been published by Octagon Process Inc., 15 Bank St., Staten Island 1, New York. It gives detailed instructions for the use of these products by wipe-on, spray and hot and cold immersion methods.

Electromax Temperature and Conductivity Controllers. Complete data about moderate-priced electronic instruments for two-position or proportional control is now available in a 20-page catalog, ND47, "Electromax Temperature and Conductivity controllers," published by the Leeds & Northrup Co., 4934 Stenton Ave., Phila. 44, Pa.

The publication shows how three types of Electromax Temperature Controllers are being used to regulate temperatures up to 1000 deg. F. It also describes an Electromax Conductivity Controller that is being used to check condensate purity.

One section of the catalog combines simple diagrams and descriptions to show how the Temperature Controllers apply two-position control of L&N proportional control. Another section presents the Electromax Systems used for all three types of temperature control, and for two-position control of conductivity. Illustrations and specifications of the control packages appear side-by-side for easy reference. Included are pictures of Electromax installations.

Detrex Washers. An 8-page, three-color booklet which describes the company's complete line of industrial washers is offered by the Detrex Corporation, Box 501, Detroit 32, Michigan. The booklet is illustrated with actual photographs of equipment ranging from single-stage to five-stage phosphate coating and paint bonding machines.

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Operational advantages are described, and some general operating hints that will be of assistance to plants using alkali or emulsion washers in their production cleaning lines are included.

Promat Metal Finishing Products. A four-page bulletin issued by Promat Division, Poor & Company, 851 S. Market St., Waukegan, Illinois, provides a condensed description of the company's zinc, cadmium, copper and white alloy plating baths.

Also described are secondary chromate treatments to render magnesium aluminum, zinc and cadmium surfaces more corrosion resistant and/or paintable. Addition agents for metal cleaning baths are also listed.

Bulletin No. 9-1. Complete engineering facts, including information on fabrication and design factors, physical strength and chemical resistance of unplasticized, rigid polyvinyl chloride Ampcoflex are provided in Bulletin 9-1, produced by Atlas Mineral Products Company, 74 Ash Street, Mertztown, Pa.

Resistance characteristics of Ampcoflex are charted to clearly indicate its applicability to specific industry corrosion problems, as well as its resistance to specific reagents at both low and high temperatures. A detailed tabulation of physical properties empnasizes the structural fitness of this lightweight, self-supporting material for various forms of corrosion-proof construction.

Techniques of unplasticized, polyvinyl chloride fabrication are also discussed in the bulletin with illustrations of fume exhaust systems, tanks, ducts, dipping baskets and similar products fabricated in Ampcoflex.

Metal Cleaning and Preparation Brochure. Available from Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich., is a general brochure describing the cleaners, phosphatizing treatments, acid addition agents, and metal preparation products manufactured and supplied to the metal products finishing industry by the company.

Cleaners discussed include: pre-soak immersion cleaners; immersion cleaners for steel brass, copper, aluminum, and magnesium; electrolytic cleaners for general use, for both ferrous and nonferrous metals, for bright copper, for polished steel, and for unpolished steel; spray cleaners for die castings, steel, non-ferrous metals, and aluminum.

Materials for phosphatizing, described in the brochure, include Interlox, Interlox Tu-Way, and Interlox No. 3.

Acid addition agents for use in pickling solutions, paint strippers, conditioners for water wash spray booths, and chemicals and processes used to prepare aluminum for spot welding are described in this comprehensive brochure.

Dual-Disc Filter. A folder issued by Sparkler Manufacturing Co., Mundelein, Ill., illustrates the Sparkler Model VR Dual-Disc Filter and describes its construction and design. The advantages and features of the filter are discussed and a specification sheet is included, together with a list of applications.

Bulletin P1248. A bulletin describing The Bristol Company's Electronic Pyrometer Controllers has just been published. Available from The Bristol Company, Waterbury 20, Conn., the new bulletin illustrates the unit plug-in construction of the new controllers and describes

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their use for low-open, high-open, low-high, low-open-high, and low-normal-high-control. A model for proportional input control action is also described. Complete specifications and full-size reproductions of actual temperature scales are also included.

Fidelity Bulletins. The Fidelity Chemical Products Corp., 470-474 Frelinghuysen Ave., Newark, N. J., has available various typed and mimeographed sheets describing the use of its products. The sheets are clipped inside a handy folder which serves to keep all the information together and in order. Some of the products covered by the bulletin sheets are: stop-offs, cleaners, water wash spray booth compounds, solvents, dry spray booth compounds, metal conditioners, degreasing solutions, strippers, aluminum etching compounds.

Directory of Occupational Safety Posters. The National Safety Council's 72-page 1953 Directory of Occupational Safety Posters contains 756 miniature illustrations of colorful safety posters. Available from the National Safety Council 425 N. Michigan Ave., Chicago 11, Ill., both serious and humorous approaches are used to provide change of pace and to enable the industrial safety director to select the soundest psychological approach to his problems.

In selecting poster subjects, the Council consulted the latest occupational accident statistics so that proper emphasis would be placed on the weakest spots. There are many posters for specific industries, such as chemical, mining, petroleum, textile, and so forth. There also is a wide selection of general themes applicable to virtually all industrial fields. The directory contains advice to safety men on how to chose and use posters effectively, and a detailed index makes it easy to locate all posters on a particular subject.

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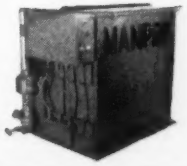

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NEW BOOKS

Methods for Treating Metal-Finishing Wastes. Prepared by the Metal-Finishing Industry Action Committee. Published by the Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati 2, Ohio. 72 pages, illustrated. Price, $2.00.

One of a series of reference-data publications sponsored by the Ohio River Valley Water Sanitation Commission, this manual represents a pooling of the knowledge and experience of a group of specialists who have been operating and appraising the various treatment methods described. For each method they evaluate the merits and the shortcomings, and then draw conclusions as to its applicability. The manual does not specify any "best" method; but, recognizing that the method to be selected in each case is determined by local conditions, it provides facts on which the method best suited to the needs of any plant or location can be selected.

The scope of the publication is indicated by the subjects discussed. These include: treatment of metal finishing wastes for removal of cyanide (10 methods); chromium treatment by reduction and precipitation; chromium treatment by precipitation; treatment by neutralization and chemical precipitation; disposal by regulated discharge; disposal by ponding; oil removal; paint spray booth wastes; disposal of waste treatment sludge; metal recovery by ion exchange; solution concentration and recovery by evaporation.

The discussion of the various treatment methods includes necessary flow sheets, typical plant installation drawings; applicable chemical reactions, and a list of some plants using the method. This enables the prospective user to compare his operation with that ot the plant using the method in question, and so determine to a greater degree the value of each method to him.

Surface Preparation Specifications. Issued by The Steel Structures Painting Council, 4400 Fifth Avenue, Pittsburgh 13, Pa. Nine three-hole punched folders and paper binder. Price, $1.00.

The specification sheets include: solvent cleaning, hand cleaning, power tool cleaning, flame cleaning of new steel, blast cleaning to "white" metal, commercial blast cleaning, brush-off blast cleaning, pickling, and weathering and cleaning.

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